Service Manual

Color Television

TC-20G12P
TC-29G12P
TC29G12PU

Specifications

TELEVISOR	TC-20G12P	TC-29G12P	TC-29G12PU
Source	AC ~ 110/220V 50/60Hz		
Consumption (Potency)	78W	99W	99W
Antenna input	75 OHMS - VHF/UHF/CATV (F outlet)		
Color system	PAL-M/PAL-N/NTSC/AUT		
Channels reception	VHF: 2 ~ 13/UHF: 14 ~ 69/CATV: 1 ~ 125		
Tuning system	by frequency (FST)		
Audio power	3 + 3W RMS		
Video input	1 Vpp, 75 OHMS		
Audio input	500mV, 47K OHMS		
Audio output	0,0 ~ 2,0V, 4,7K OHMS		
Audio reception	STEREO, SAP, MONO		
Visual diagonal Cinescope	PANABLACK 480 mm	PANABLACK 680 mm	PANABLACK 680 mm
Dimensions (W / H / D)	630 x 468 x 483 mm	800 x 576 x 545 mm	800 x 576 x 545 mm
Weight	19,5 kg	35 kg	35 kg

Remote Control Transmiter:

Power Source	3V (2 R6 batteries)
Infrared Length	9500 A (Angstron)
Number of Buttons	20 buttons
Dimensions (W x H x D)	(51 x 26 x 140) mm

Provided accessories
- 1 Remote Control Transmiter
- 1 Antenna adaptor 300Ω/75Ω
- 2 R6 size batteries 1,5V (ABNT/IEC)

The above specifications are subject to changes without notice.

Panasonic®

Important Safety Notice

Special components are used in this television set which are important for safety. These parts are identified on the schematic diagram by the symbol ⚠. It is essential that these critical parts are replaced whit the manufacturer's specified replacement parts to prevent X-ray radiation, shock, fire or other hazards. Do not modify the original design whitout manufacturer's permission.

Table of Contents

General Guidelines

An Isolation Transformer should always be used during the servicing of a receiver whose chassis is not isolated from the AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks. It will also protect the Receiver from being damaged by accidental shorting that may occur during servicing.

When servicing, observe the original lead dress, especially in the high voltage circuit. Replace all damaged parts (also parts that show signs of overheating.)

Always Replace Protective Devices, such as fishpaper, isolation resistors and capacitors, and shields after servicing the Receiver. Use only manufacturer's recommended rating for fuses, circuit breakers, etc.

High potentials are present when this Receiver is operating. Operation of the Receiver without the rear cover introduces danger from electrical shock. Servicing should not be performed by anyone who is not thoroughly familiar with the necessary precautions when servicing high-voltage equipment.

Extreme care should be practiced when Handling the Picture Tube. Rough handling may cause it to implode due to atmospheric pressure (14.7 lbs per sq. in). Do not sick or scratch the glass or subject it to any undue pressure. When handling, use safety goggles and heavy gloves for protection. Discharge the picture tube by shorting the anode to chassis ground (not to the cabinet or to other mounting hardware). When discharging, connect cold ground (i.e. dag ground lead) to the anode with a well insulated wire or use a grounding probe.

Avoid prolonged exposure at close range to unshielded areas of the picture tube to prevent exposure to X-ray radiation.

The Test Picture Tube used for servicing the chassis at the bench should incorporate safety glass and magnetic shielding. The safety glass provides shieldinf for the tube viewing area against X-ray radiation as well as implosion. The magnetic shield limits X-ray radiation around the bell of the picture tube in addition to restricting magnetic effects. When using a picture tube test jig for service, ensure that the jig is capable of handling 31kV without causing X-ray radiation.

Before returning a serviced receiver to the owner, the service technician must thoroughly test the unit to ensure that is completely safe to operatore. Do not use a line isolation transformer when testing.
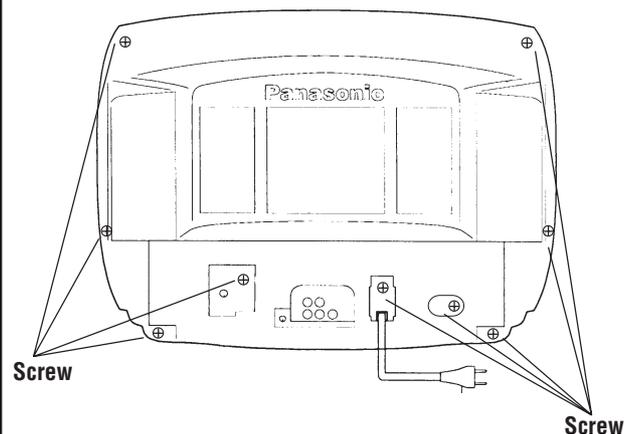

Warning !

⚠ It is essential that these critical parts are replaced with the manufacturer's specified replacement parts to prevent X-ray radiation, shock, fire or other hazards.

HOW TO OPEN THE CABINET

Screw

Screw

Controls Location

Frontal View

1. **POWER button**
   By pressing this button the TV set is placed on **STAND BY**, and it is necessary to press the button **STAND BY** (3) to turn the TV set on.
   When switched to **OFF** the TV set is completely disconnected from the **POWER LINE**.

2. **Status light**
   Indicates the state the TV set is in:
   Light off - set is completely disconnected from power.
   Light on - set is on or in **STAND BY** mode.

3. **"STAND BY" button**
   Press to turn the TV set on or off, when the **ON/OFF** button (1) is in the **ON** position.

4. **"ACTION" button**
   Press this button to display the main menu and access the TV set functions.

5. **"TV/VIDEO" selection button**
   Press this button to select TV input or video input (AV).

6. **Volume control buttons (◀ VOLUME ▶)**
   Press these buttons to adjust sound level. Use these buttons also to adjust audio and video functions when using a menu.

7. **Channel selection buttons (▼ CHANNEL ▲)**
   Press these buttons to select programmed channels. Use these buttons also to select a desired function when using a menu.
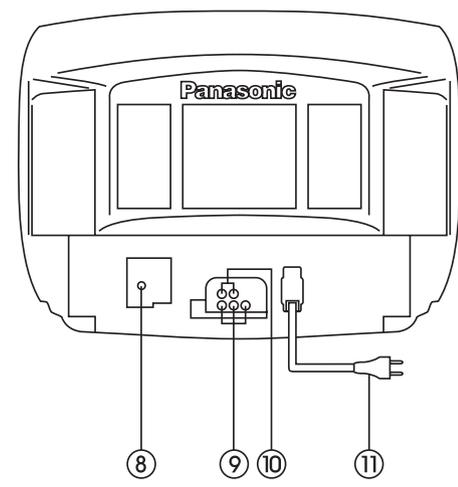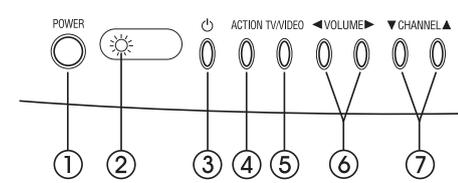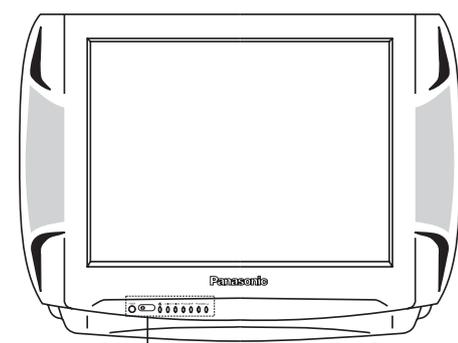
Rear view

8. **Antenna connection**

9. **Audio and Video input terminals (ENT. AUDIO VIDEO)**
   Use these terminals to connect external equipment such as VCR, video camera, video game, etc.

10. **Audio output (P/AMPLIF. DE AUDIO)**
    Use this terminal to output audio to an external stereo amplifier.
    Do not connect loudspeakers directly to this terminal

11. **Power cable**

Controls Location

Remote control

1. **POWER button**
   Press to turn the TV set on or off.
   The **POWER** button in the TV set must be **ON**.

2. **Button to turn the sound temporarily off "MUTE"**
   Press this button once to turn the sound temporarily off. Press again to turn the sound on again.

3. **Volume control buttons (◀ VOLUME ▶)**
   Press these buttons to adjust sound level. Use these buttons also to adjust audio and video functions when using a menu.

4. **"R-TUNE" button**
   Press this button to alternate between the two last channels selected.

5. **"TV/VIDEO" selection button**
   Press this button to select TV input or video input (AV).

6. **Channel selection buttons (▼ CHANNEL ▲)**
   Press these buttons to select programmed channels. Use these buttons also to select a desired function when using a menu.

7. **"ACTION" button**
   Press this button to display the main menu and access the TV set functions.

8. **Buttons numbered from 0 to 9 (Numerical keypad)**
   Use these buttons to key in the number of the desired channel:
   2 - 69: TV mode
   1 - 125: CABLE mode

9. **RECALL button**
   Press this button to display the time, the countdown to automatic turn off when **SLEEP** mode has been set, the channel currently selected, the video mode, channel identification, and the audio mode if activated.
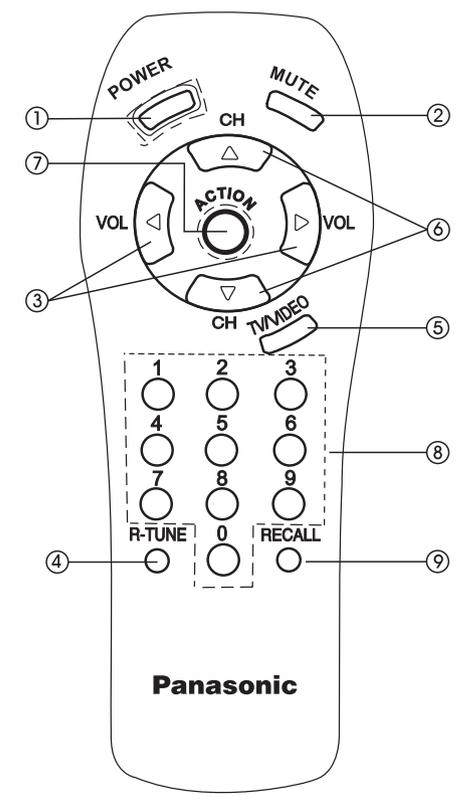
Installation

### How to connect an external antenna

To obtain the best audio and video quality it is necessary to install an external antenna, with adequate cables (75 ohms co-axial cable) and the adequate terminal connector.

Your local TV service can help you to acquire the adequate system and accessories for the installation of an external antenna in your location.

Any other options of installation, upgrading of existing systems or required accessories, and the cost for such options, are the owner's responsibility.

TV set rear panel

or

Parallel cable (300 Ω)

Inpedance converter 300 Ω → 75 Ω (comes with the equipment)

Coaxial cable (75 Ω)
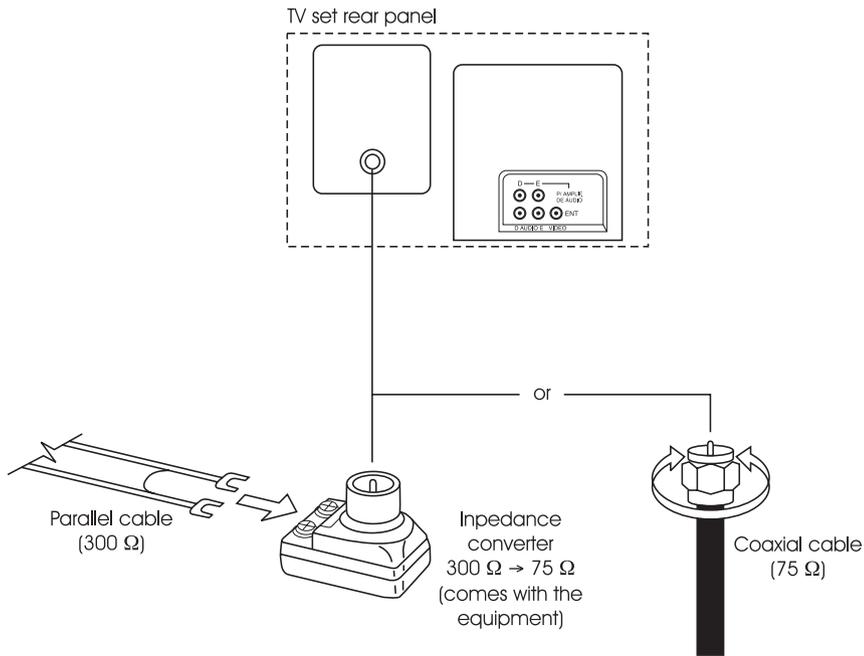
Operation

POWER button

When pressed the TV set is placed on **STAND BY**, and it is necessary to press the button **STAND BY** on the set panel or **POWER** on the remote control to turn the TV set on.

STAND BY button

Use this button to turn the TV set on and off. The **POWER** button TV set must be in the **ON** position.

AT REMOTE CONTROL UNIT   AT TV SET

VOLUME buttons

Press these buttons to adjust sound level.

AT REMOTE CONTROL UNIT   AT TV SET
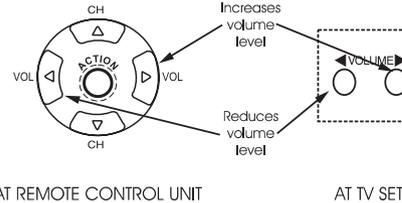
MUTE button

Press this button to temporarily turn off the sound.

On the screen the red icon "◁" will appear. To turn the sound back on press this button again.

MUTE

ONLY AT THE REMOTE CONTROL UNIT

Switching channels - two alternatives

1st alternative

Press the buttons **CHANNEL (▼ or ▲)** to step back or forward through the channels, in the sequence in which they have been programmed.

AT REMOTE CONTROL UNIT   AT TV SET
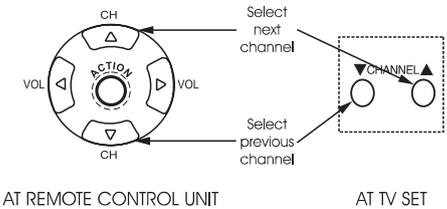
2nd alternative

Enter the digits for the channel in the numerical keypad (for example, for channel 5 press the 0 button followed by the 5 button). For channels over 99, press sequentially the three buttons corresponding to the desired channel.

ONLY AT REMOTE CONTROL UNIT
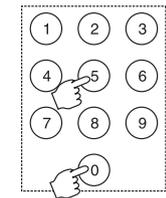
Notes:

- When the TV set is turned on for the first time or when the channel is changed, useful information will be temporarily displayed on the screen.
- When using the numerical keypad in CABLE mode to select channels 10, 11, or 12, there is a delay before the channels are changed, due to the possibility of the channels 100 to 125 being selected.
- If the signals for channels over 13 are not received, verify the type of antenna input (Cable or TV) and adjust the corresponding tune in (check item **"Configuration properties"** in the manual for the antenna type).

Operation

TV/VIDEO button

Press this button to select TV input or VIDEO input.

Signal of the set connected to the entry of video and audio at rear panel of the TV set ⟶ VIDEO

Signal of the TV set for Cable TV ⟶ CN 02
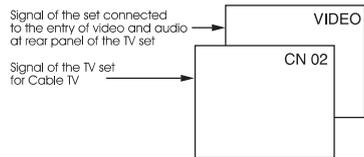
RECALL button

Press this button to display the following functions:

- The audio mode state
- Channel number or the selected video input
- The clock state for the automatic turn off (if **SLEEP** mode is active)
- Time (if previously set)
- Channel identification (if previously set)

RECALL

ONLY AT REMOTE CONTROL UNIT

Channels symbol
Channel number
Audio Modality
Video modality

STEREO   VIDEO
SAP   CN 03
MONO   XYYZ

29   1:00

Timer   Timer
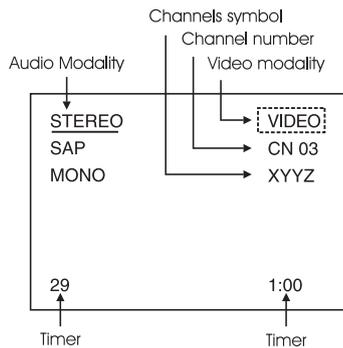
R-TUNE quick tune in button

Use this button to alternate instantly between the two channels last selected.

R-TUNE

ONLY AT REMOTE CONTROL UNIT

CHANNEL BEING WATCHED

Press the button   Press the button again
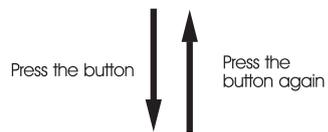
CHANNEL BEING
PREVIOUSLY WATCHED

Operation

SET UP   AUDIO   TIMER

PICTURE   3 NBC   LOCK
          CH CAP

E X I T

AT REMOTE CONTROL UNIT

CH
VOL   ACTION   VOL
CH
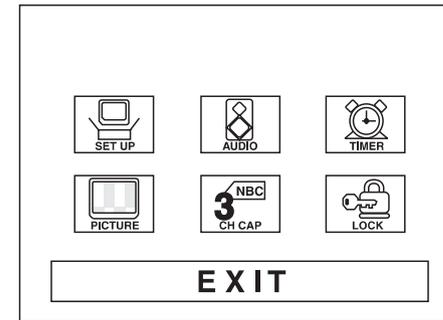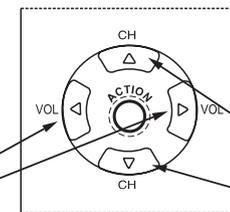
Adjust the sound volume level and also selects or adjust functions when the main menu is showed on the screen

Select preset channels and also selects the desired function when the main menu is showed on the screen

AT THE TV SET
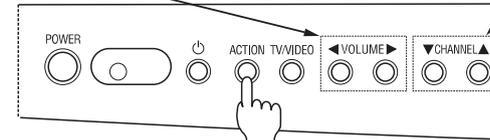
POWER   ⏻   ACTION TV/VIDEO   ◀ VOLUME ▶   ▼ CHANNEL ▲

1. Press the **ACTION** button to display the main menu.

2. Use the **CHANNEL buttons (▼ or ▲)** or **VOLUME buttons (◀ or ▶)** to select from the menu the symbol of the desired function (the selected symbol will display in red).

3. To exit the main menu, select the symbol **EXIT** and press the **ACTION** button.

Operation

Selecting the MENU language

The language of the menu is factory set to Brazilian Portuguese. Follow the instructions below to change the menu language to either English, Portuguese or Spanish.

1. Press the **ACTION** button to display the main menu.
2. Use the **CHANNEL** buttons (▼ or ▲) or **VOLUME** buttons (◄ or ►) to select the **SETUP** menu.
3. Press the **ACTION** button again to display the **ADJUST** menu as shown in the following illustration.
4. Use the **CHANNEL** buttons (▼ or ▲) to select the function for language selection "**ENGLISH**, **ESPAÑOL** or **PORTUGUES**".

```
SETUP
SET TIMER          --:--
AUTO POWER ON      OFF
CC MODE            OFF
BLUE BACK          ON
COLOR TEMP         STANDARD
ENGLISH  ESPAÑOL  PORTUGUES
PRESS CH ▼ FOR MORE
```
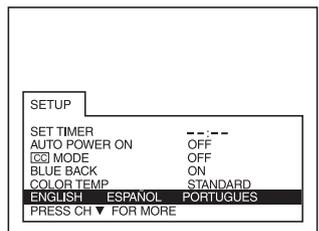
5. Use the **VOLUME** buttons (◄ or ►) to select the desired language "Inglês=English", "Español=Espanhol" or "Português".
6. Press the **ACTION** button twice to exit from the **AJUSTE** mode.

Selection of audio mode (STEREO, SAP, MONO) and Sound "AI"

Stereo, SAP, Mono

When the sound is transmitted in stereo or SAP (according to the audio program), this information will display on the screen when the set is turned on or when the channel is changed. Available options are displayed in red. In **MONO** mode, the information will display only if the **RECALL** button is pressed (all options in yellow).

ACTION

Selects next channel
CH △
Increases volume level
VOL ◁ ACTION ▷ VOL
Reduces volume level
CH ▽
Selects previous channel
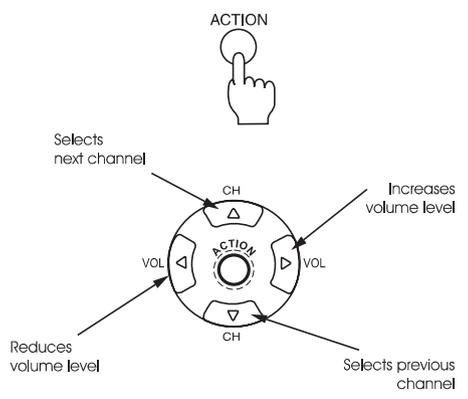
Notes:

STEREO - sound reception through two sound channels, when broadcast as such.

SAP - According to audio program (usually allows reception of audio that is broadcast in the original language).

MONO - When the audio signal is broadcast through only one channel, or when the stereo reception is not good.

Operation

1. Press the **ACTION** button to display the main menu.
2. Use the **CHANNEL** buttons (▼ or ▲) or **VOLUME** buttons (◄ or ►) to select the "**AUDIO**" symbol.
3. Press again the **ACTION** button to display the audio adjustment menu.

```
AUDIO
MODE        STEREO  SAP  MONO
AI SOUND       ON
```

4. Use the **VOLUME** buttons (◄ or ►) to select **STEREO**, **SAP** or **MONO**. The option selected will be highlighted.
5. Press the **ACTION** button twice to exit the audio adjustment menu.

Sound "AI" (Artificial Intelligence)

This function monitors the sound volume, keeping it at a constant level between the program being watched and the commercial break.

1. Press the **ACTION** button to display the main menu.
2. Use the **CHANNEL** buttons (▼ or ▲) or VOLUME buttons to select the "AUDIO" symbol.
3. Press the **ACTION** button to display the audio adjustment menu.

```
AUDIO
MODE        STEREO  SAP  MONO
AI SOUND       ON
```
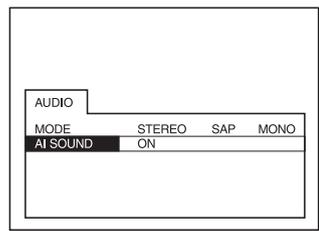
4. Use the **CHANNEL** buttons (▼ or ▲) to select Sound "AI".
5. Use the **VOLUME** buttons (◄ or ►) to select "**ON**" or "**OFF**" for the function Sound "AI".
6. Press the **ACTION** button twice to exit the audio adjustment menu.

Observation:
When switching the TV set to video mode, the function "Sound AI" is automatically turned off and the audio menu option is not displayed in the main menu.

Operation

Adjusting the image

This TV set has 4 pre-adjusted image menus: **DINAMIC**, **NORMAL**, **SOFT** and **GAME**. Within each of these menus it is possible to change image configuration according to your preference. If a return to the default factory values is desired, select **YES** in the **NORMAL IMAGE** item of the image menu.

ACTION

Selects next channel

CH

Increases volume level

VOL ◁ ACTION ▷ VOL

Reduces volume level

CH

Selects previous channel

Image menu adjustment

1. Press the **ACTION** button to display the main menu.
2. Use **CHANNEL** buttons (▼ or ▲) or **VOLUME** buttons (◄ or ►) to select the menu **PICTURE**.
3. Press the **ACTION** button again to display the **ADJUSTMENT** menu, as shown in the illustration.
4. Use the **VOLUME** buttons (◄ or ►) to select one of the options: **DINAMIC**, **NORMAL**, **SOFT**, or **GAME**.
5. Press the **ACTION** button twice to exit the adjustment menu.

Adjusting color, hue, brightness, contrast and sharpness

1. Press the **ACTION** button to display the main menu.
2. Use **CHANNEL** buttons (▼ or ▲) or **VOLUME** buttons (◄ or ►) to select the menu **PICTURE**.
3. Press the **ACTION** button again to display the image adjustment menu.

```
PICTURE

MENU            DINAMIC
PICTURE NORMAL  NO
COLOR           32 IIIIIIIIIIIIIIIIIIIIIIII
NTSC - TINT     32 I- - - - - I- - - - - -
BRIGHTNESS      32 IIIIIIIIIIII- - - - - -
CONTRAST        63 IIIIIIIIIIIIIIIIIIIII- - - - - -
SHARPNESS       32 IIIIIIIIIIIIIII- - - - - -
```

4. Use the **CHANNEL** buttons (▼ or ▲) to select the desired image function (color, hue, brightness, contrast and sharpness).
5. Use the **VOLUME** buttons (◄ or ►) to adjust the value for the selected image function.
6. Repeat steps 4 and 5 to change the remaining image functions.
7. Press the **ACTION** button twice to exit the image adjustment menu.

Image normalization

When pressing either of the **VOLUME** buttons while the image normalization adjustment (**NORMAL IMAGE**) is selected, all image adjustment values return to the preset factory values.

It may be that while adjusting contrast and brightness to minimum values, the displayed menu becomes too dark. If this happens, press the **ACTION** and **POWER** (on the TV set panel) buttons simultaneously for at least 5 seconds. By doing this, all values already configured by the user, such as clock, color and channel color system, are reset to the original factory settings.

Operation

Blue screen (BLUE BACK)

This function, when activated, displays a blue screen when the selected channel does not have any signal or also in AV mode with no signal (for example: the VCR connected to the AV input terminal is turned off.). This function avoids the display of white noise in the screen ("drizzle").

1. Press the **ACTION** button to display the main menu.
2. Use the **CHANNEL** buttons (▼ or ▲) or **VOLUME** buttons (◄ or ►) to select the **SETUP** menu.
3. Press again the **ACTION** button to display the **ADJUSTMENT** menu, as shown in the illustration at right.
4. Use the **CHANNEL** buttons (▼ or ▲) to select the **BLUE BACK** function.
5. Use the **VOLUME** buttons (◄ or ►) to select between **ON** or **OFF**.
6. Press the **ACTION** button twice to exit the adjustment menu.

```
SETUP

SET TIME                    - -:- -
AUTO POWER ON      OFF
CC MODE            OFF
BLUE BACK          ON
COLOR TEMP         STANDARD
ENGLISH   ESPAÑOL  PORTUGUES
PRESS CH ▼ FOR MORE
```

Adjusting COLOR TEMPERATURE

Use this function to adjust the color tint to red, blue or normal.

1. Press the **ACTION** button to display the main menu.
2. Use the **CHANNEL** buttons (▼ or ▲) or **VOLUME** buttons (◄ or ►) to select the **SETUP** menu.
3. Press again the **ACTION** BUTTON to display the **ADJUSTMENT** menu, as shown in the illustration at right.
4. Use the **CHANNEL** buttons (▼ or ▲) to select the **COLOR TEMPERATURE** function.
5. Use the **VOLUME** buttons (◄ or ►) to select between **BLUE**, **NORMAL**, or **RED**, according to preference.
6. Press the **ACTION** button twice to exit the adjustment menu.

```
SETUP

SET TIME                    - -:- -
AUTO POWER ON      OFF
CC MODE            OFF
BLUE BACK
COLOR TEMP         STANDARD
ENGLISH   ESPANOL  PORTUGUES
PRESS CH ▼ FOR MORE
```

Operation

Color system and color saturation adjustment for each channel

This TV set is compatible with three broadcast standards. That means this TV set can be used where either the PAL-M, PAL-N, or NTSC transmission standard is used. The **AUTO** capability allows the set to recognize automatically the broadcast standard being used. Besides this, color levels can be adjusted independently for each channel. Therefore, it is possible to equalize eventual color differences among channels.

Channel color system

1. Press the **ACTION** button to display the main menu.
2. Use the **CHANNEL** buttons (▼ or ▲) or **VOLUME** buttons (◄ or ►) to select the **SET UP** menu.
3. Press again the **ACTION** button to display the **ADJUSTMENT** menu, as shown in the illustration below.

```
SETUP
SET TIME              – – : – –
AUTO POWER ON         OFF
CC MODE               OFF
BLUE BACK
COLOR TEMP            STANDARD
ENGLISH  ESPAÑOL     PORTUGUES
PRESS CH ▼ FOR MORE
```

4. Press the **CHANNEL** button (▼) to select the option "**PRESS CH ▼ FOR OTHER OPTIONS**", and a second page for adjustments will display.
5. Press the **CHANNEL** button (▼) to select the **CHANNEL** function. If the set is in video mode, skip instructions 5 and 6.
6. Using the **VOLUME** buttons (◄ or ►) or the numerical keypad, select the channel to be adjusted.
7. Press the **CHANNEL** (▼) button to select the function **COLOR SYSTEM**.
8. Use the **VOLUME** buttons to select either **PAL-M**, **PAL-N**, **NTSC**, or **AUTO**.
9. Press the **ACTION** button twice to exit the adjustment menu.

Adjusting color for each channel

1. Press the **ACTION** button to display the main menu.
2. Use the **CHANNEL** buttons (▼ or ▲) or **VOLUME** buttons (◄ or ►) to select the **SET UP** menu.
3. Press again the **ACTION** button to display the **ADJUSTMENT** menu, as shown in the illustration below.

```
SETUP
SET TIME              – – : – –
AUTO POWER ON         OFF
CC MODE               OFF
BLUE BACK
COLOR TEMP            STANDARD
ENGLISH  ESPAÑOL     PORTUGUES
PRESS CH ▼ FOR MORE
```

4. Press the **CHANNEL** button (▼) to select the option "**PRESS CH ▼ FOR OTHER OPTIONS**", and a second page for adjustments will display.
5. Press the **CHANNEL** button (▼) to select the **CHANNEL** function. If the set is in video mode, skip instructions 5 and 6.
6. Using the **VOLUME** buttons (◄ or ►) or the numerical keypad, select the channel to be adjusted.
7. Press the **CHANNEL** (▼) button to select the function **CHANNEL COLOR ADJUSTMENT**.
8. Use the **VOLUME** buttons to select between ("**I—**" minimum), ("**-I-**" normal), or ("**—I**" maximum).
9. Press the **ACTION** button twice to exit the adjustment menu.

Operation

Game Guard

Blocking Games (accessible only through the remote control unit)

This function blocks the use of the TV set for games or other video input. Channels 3 and 4, together with the video input terminals, can be disabled for 12, 24 or 48 hours, depending on your preference.

Obs.: Make sure this function is fully understood before using it. Find a password that is easy to memorize, or write the password down somewhere.

Important: Once activated, the blocking remains active even after turning off the TV set and disconnecting it from the power line.

1. Press the **ACTION** button to display the main menu.
2. Use the **CHANNEL** buttons (▼ or ▲) or **VOLUME** buttons (◄ or ►) to select the symbol "**LOCK**".
3. Press again the **ACTION** button to display the **GAME GUARD** menu.

```
GAME GUARD
LOCKS CH 3, 4 AND VIDEO INPUT
HOW LONG?           12 HRS
ENTER CODE          – –
SET                 NO
```
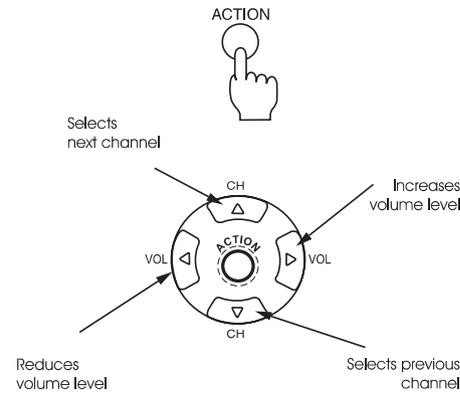
4. Press the button **VOLUME** (►) to select the time period desired (12, 24, 48) for channel blocking.
5. Press the button **CHANNEL** (▼) to select the option "**ENTER PASSWORD**". When prompted, enter a three-digit password using the numerical keypad on the remote control.

Important Observation:

Try to find a password that is easy to memorize, or write the password down somewhere.

6. After entering the three-digit password, press the button **VOLUME** (►) to activate channel blocking. The words "**GAME GUARD LOCKED**" will display on the screen.

```
GAME GUARD
LOCKED
```

Operation

Unlocking channels

To unlock channels, follow steps 1 through 3 of the "**GAME GUARD**" procedure.
Then, using the numerical keypad on the remote control, key in exactly the three-digit password previously selected during the **GAME GUARD** procedure.

GAME GUARD LOCKED LOCK ACTIVATED ENTER CODE TO CHANGE SETTING - - -	GAME GUARD UNLOCKED	INVALID CODE ENTERED
Type the same 3-digits code previously used.	Unlocked (in case the code is correct)	Locked (in case the code is different)
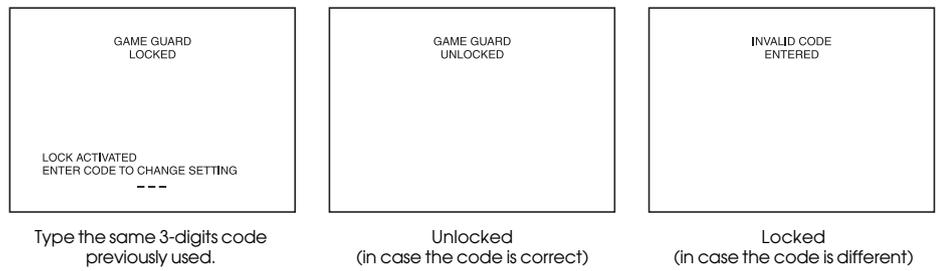
Automatic turning off (SLEEP TIMER)

This function allows the TV set to automatically turn itself off after 30, 60, or 90 minutes.

Obs.: Press the **RECALL** button to display the time remaining until automatic turn off. When there are only 3 minutes left, the remaining countdown will display automatically on the screen (3, 2, or 1).

Note: This function is deactivated when the function "**AUTO POWER ON**" is on.

1. Adjusting using the main menu.

1. Press the **ACTION** button to display the main menu.

ACTION

Selects
next channel

CH
△

VOL ◁ ACTION ▷ VOL

▽
CH

Reduces
volume level

Increases
volume level

Selects previous
channel
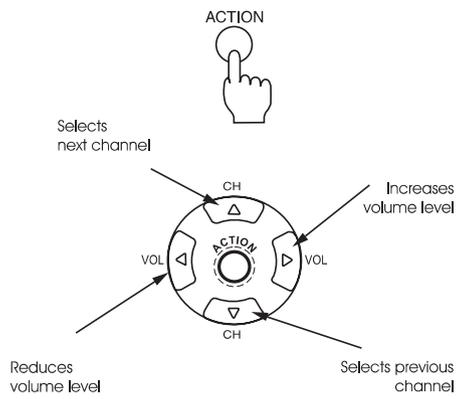
2. Use the **CHANNEL** buttons (▼ or ▲) or **VOLUME** buttons (◄ or ►) to select the symbol "**TIMER**".

3. Press again the **ACTION** button to display the **TIMER CONTROL** menu.

```
TIMER CONTROL

SLEEP TIMER        NO
PROGRAM TIMER
  ON             --:--
  OFF            --:--
  CHANNEL          3
  SET          TIME FIRST
```
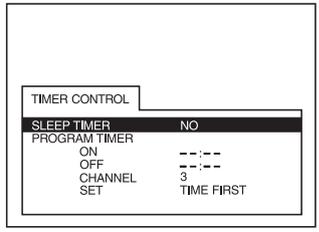
4. Press the button **VOLUME** (►) to select the time period desired: 30, 60, or 90 minutes in the **SLEEP TIMER** line (the sleep timer will be activated).

5. Press the **ACTION** button twice to exit the timer adjustment menu.

Obs.: To deactivate the automatic turn off timer, repeat steps 1 to 4, and in step 4 select "**NO**" in the **SLEEP TIMER** line.

Operation

Programming timer ON/OFF

The **POWER** button must be in the **ON** position for these functions to be available.

This function allows to turn the TV set on automatically at a programmed time and channel, and to turn it off automatically at a programmed time (the program can be set for a specific day or for every day).

Obs.: For this function to work properly, make sure the TV set clock is set to the correct time (please check the clock configuration menu).

Note: This function is automatically disabled when the function "**AUTO POWER ON**" is on.

Special feature

Automatic turn off after 90 minutes.

This TV set has a special feature: the set turns itself off after 90 minutes if there is no activation of any function during this period.

For the automatic turn off to occur, the TV set must be turn on by "**PROGRAM TIMER ON**" and the function "**PROGRAM TIMER OFF**" should not be programmed.

The automatic turn off does not occur if any button of any function has been pressed during the 90 minutes.

This feature avoids the TV set remaining on for a long period without a viewer.

1. Press the **ACTION** button to display the

ACTION

Selects
next channel

CH
△

VOL ◁ ACTION ▷ VOL

▽
CH

Reduces
volume level

Increases
volume level

Selects previous
channel
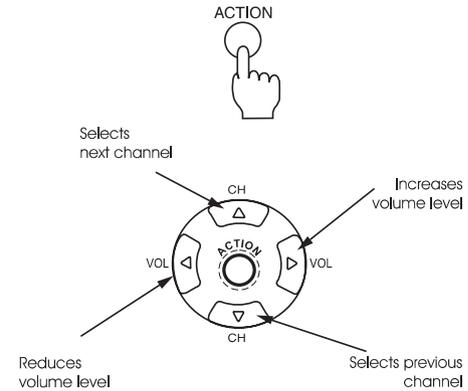
Notes:

- If the message "**GAME GUARD**" (game playing disabled) displays in the top right corner of the screen, it means that the selected channel and video input terminal are disabled.
- If the automatic on/off timer is activated and displays on the screen when the TV set is on, the set will automatically tune in the channel that was selected using this function.
- The time standard for this TV set is AM/PM, that is:
  AM = 0:00 hrs. - 12:00 hrs. (morning)
  PM = 0:00 hrs. - 12:00 hrs. (afternoon)

main menu.

2. Use the **CHANNEL** buttons (▼ or ▲) or **VOLUME** buttons (◄ or ►) to select the symbol "**TIMER**".

Operation

3. Press again the **ACTION** button to display the timer control menu.

```
TIMER CONTROL

SLEEP TIMER
ON          --:--
OFF         --:--
CHANNEL     3
SET         TIME FIRST
```
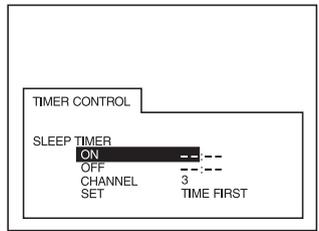
4. Press the button **CHANNEL** (▼) to select "**ON**" (turn on time).

5. Adjust the activation time using the **VOLUME** buttons (◄ or ►). Pay attention to the AM or PM period desired.

6. Press the button **CHANNEL** (▼) to select minutes adjustment.

7. Adjust the minutes using the **VOLUME** buttons (◄ or ►).

8. Press the button **CHANNEL** (▼) to select "**OFF**"(time to turn off the set).

9. Repeat steps 5 through 7 to program the hour and minutes when the TV set should turn itself off (**OFF**).

10. Press the button **CHANNEL** (▼) to select "CHANNEL".

11. Use the **VOLUME** buttons (◄ or ►) or the numerical keypad on the remote control to select the number of the channel to tune in when the TV set turns itself on automatically.

12. Press the button **CHANNEL** (▼) to select "**SET**".

13. Press the button **VOLUME** (►) to select one of the following options:

- **NO** - Disabled
- **ONE DAY** - Activated for the current day
- **EVERY DAY** - Activated for all days

Obs.: To deactivate the automatic on/off timer, select "**NO**" in step 13.

14. Press the **ACTION** button twice to exit the timer adjustment menu.

Setting Characteristic


```
SETUP

SET TIME        --:--
AUTO POWER ON   OFF
CC MODE         OFF
BLUE BACK       ON
COLOR TEMP      STANDARD
ENGLISH  ESPAÑOL  PORTUGUES
PRESS CH ▼ FOR MORE
```
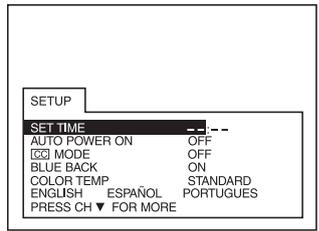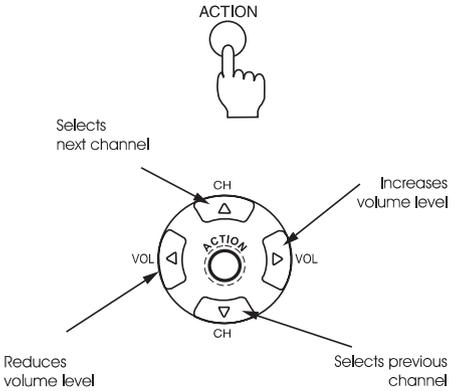
Operation

Adjusting the clock

To adjust the clock the **POWER** button must be in the **ON** position.

If the TV set is turn off by the **POWER** button, the clock must be adjusted again.

The clock, provided that the time has been adjusted, will display on the screen when the set is turned on, when the channel is changed, or by pressing the "**RECALL**" button. To use the automatic on/of timer function, the clock must be adjusted beforehand.

Note: This function is automatically disabled when the function "**AUTO POWER ON**" is **SET**.
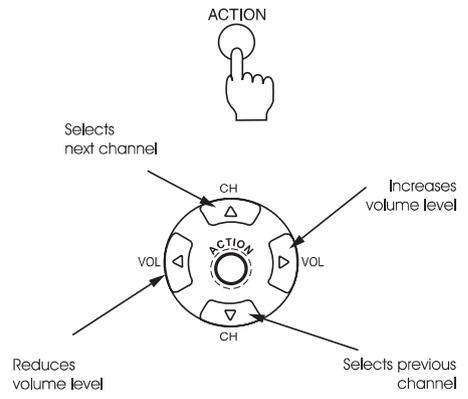
1. Press the **ACTION** button to display the main menu.

2. Use the **CHANNEL** buttons (▼ or ▲) or **VOLUME** buttons (◄ or ►) to select the symbol "**SET-UP**".

3. Press again the **ACTION** button to display the adjustment menu.

```
SETUP

SET TIME        --:--
AUTO POWER ON   OFF
CC MODE         OFF
BLUE BACK       ON
COLOR TEMP      STANDARD
ENGLISH  ESPAÑOL  PORTUGUES
PRESS CH ▼ FOR MORE
```
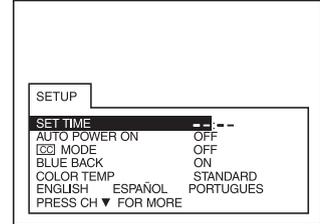
4. Use the **VOLUME** buttons (◄ or ►) to adjust the time, paying attention to the AM and PM indications.

5. Press the button **CHANNEL** (▼) to select the adjustment of minutes.

6. Adjust the minutes using the **VOLUME** buttons (◄ or ►).

7. Press the **ACTION** button twice to exit the configuration menu.

Operation

Adjusting the image

This TV set has 4 pre-adjusted image menus: **DINAMIC**, **NORMAL**, **SOFT** and **GAME**. Within each of these menus it is possible to change image configuration according to your preference. If a return to the default factory values is desired, select **YES** in the **NORMAL IMAGE** item of the image menu.

ACTION

Selects next channel

CH

Increases volume level

VOL   ACTION   VOL

CH

Reduces volume level

Selects previous channel

Image menu adjustment

1. Press the **ACTION** button to display the main menu.
2. Use **CHANNEL** buttons (▼ or ▲) or **VOLUME** buttons (◄ or ►) to select the menu **PICTURE**.
3. Press the **ACTION** button again to display the **ADJUSTMENT** menu, as shown in the illustration.
4. Use the **VOLUME** buttons (◄ or ►) to select one of the options: **DINAMIC**, **NORMAL**, **SOFT**, or **GAME**.
5. Press the **ACTION** button twice to exit the adjustment menu.

Adjusting color, hue, brightness, contrast and sharpness

1. Press the **ACTION** button to display the main menu.
2. Use **CHANNEL** buttons (▼ or ▲) or **VOLUME** buttons (◄ or ►) to select the menu **PICTURE**.
3. Press the **ACTION** button again to display the image adjustment menu.

```
PICTURE

MENU              DINAMIC
PICTURE NORMAL    NO
COLOR             32 IIIIIIIIIIIIIIIIIIIIIIIII
NTSC - TINT       32 - - - - - I - - - - - -
BRIGHTNESS        32 IIIIIIIIIIIII - - - - - -
CONTRAST          63 IIIIIIIIIIIIIIIIIIIII - - - - - -
SHARPNESS         32 IIIIIIIIIIIIIII - - - - - -
```

4. Use the **CHANNEL** buttons (▼ or ▲) to select the desired image function (color, hue, brightness, contrast and sharpness).
5. Use the **VOLUME** buttons (◄ or ►) to adjust the value for the selected image function.
6. Repeat steps 4 and 5 to change the remaining image functions.
7. Press the **ACTION** button twice to exit the image adjustment menu.

Image normalization

When pressing either of the **VOLUME** buttons while the image normalization adjustment (**NORMAL IMAGE**) is selected, all image adjustment values return to the preset factory values.

It may be that while adjusting contrast and brightness to minimum values, the displayed menu becomes too dark. If this happens, press the **ACTION** and **POWER** (on the TV set panel) buttons simultaneously for at least 5 seconds. By doing this, all values already configured by the user, such as clock, color and channel color system, are reset to the original factory settings.

Operation

Blue screen (BLUE BACK)

This function, when activated, displays a blue screen when the selected channel does not have any signal or also in AV mode with no signal (for example: the VCR connected to the AV input terminal is turned off.). This function avoids the display of white noise in the screen ("drizzle").

1. Press the **ACTION** button to display the main menu.
2. Use the **CHANNEL** buttons (▼ or ▲) or **VOLUME** buttons (◄ or ►) to select the **SETUP** menu.
3. Press again the **ACTION** button to display the **ADJUSTMENT** menu, as shown in the illustration at right.
4. Use the **CHANNEL** buttons (▼ or ▲) to select the **BLUE BACK** function.
5. Use the **VOLUME** buttons (◄ or ►) to select between **ON** or **OFF**.
6. Press the **ACTION** button twice to exit the adjustment menu.

```
SETUP

SET TIME           - - : - -
AUTO POWER ON      OFF
CC MODE            OFF
BLUE BACK          ON
COLOR TEMP         STANDARD
ENGLISH   ESPAÑOL  PORTUGUES
PRESS CH ▼ FOR MORE
```

Adjusting COLOR TEMPERATURE

Use this function to adjust the color tint to red, blue or normal.

1. Press the **ACTION** button to display the main menu.
2. Use the **CHANNEL** buttons (▼ or ▲) or **VOLUME** buttons (◄ or ►) to select the **SETUP** menu.
3. Press again the **ACTION** BUTTON to display the **ADJUSTMENT** menu, as shown in the illustration at right.
4. Use the **CHANNEL** buttons (▼ or ▲) to select the **COLOR TEMPERATURE** function.
5. Use the **VOLUME** buttons (◄ or ►) to select between **BLUE**, **NORMAL**, or **RED**, according to preference.
6. Press the **ACTION** button twice to exit the adjustment menu.

```
SETUP

SET TIME           - - : - -
AUTO POWER ON      OFF
CC MODE            OFF
BLUE BACK
COLOR TEMP         STANDARD
ENGLISH   ESPANOL  PORTUGUES
PRESS CH ▼ FOR MORE
```

Operation

Antenna mode

Tune in mode for TV or Cable TV.

It is necessary to select the antenna input appropriate for the input mode corresponding to the type of the local broadcast signal.

Note: This function is disabled when the function "**GAME GUARD**" is active.

- The TV mode is used when the TV set is not connected to a cable network. For example, when a VHF/UHF (channels 02 to 69) antenna is being used instead.

- The Cable mode is used when the TV set is connected directly to a cable network, and a decoder box - supplied by the cable company - is not being used (channels 01 to 125).
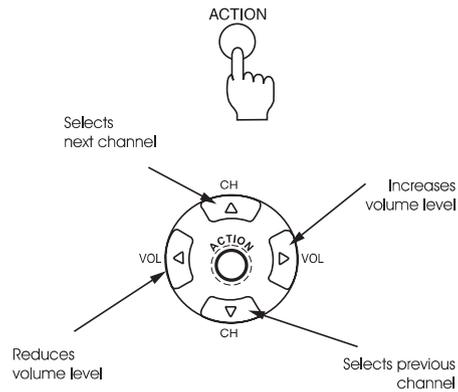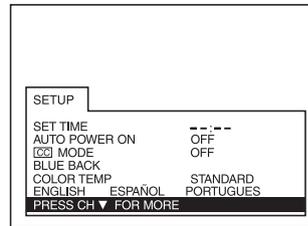
ACTION

Selects
next channel

Increases
volume level

CH

VOL ◁   ▷ VOL

CH

Reduces
volume level

Selects previous
channel

1. Press the **ACTION** button to display the main menu.
2. Use the **CHANNEL** buttons (▼ or ▲) or **VOLUME** buttons (◄ or ►) to select the symbol "**SET-UP**".

3. Press again the **ACTION** button to display the adjustment menu.

```
SETUP

SET TIME              --:--
AUTO POWER ON         OFF
CC MODE               OFF
BLUE BACK
COLOR TEMP            STANDARD
ENGLISH   ESPAÑOL   PORTUGUES
PRESS CH ▼ FOR MORE
```

4. Press the button **CHANNEL** (▼) to select the option "**PRESS CH ▼ FOR MORE**", and a second page with options will display.
5. Use the **VOLUME** buttons (◄ or ►) to select "**TV**" or "**CABLE**".

Operation

Automatic channel tuning

Through this function, it is possible to tune in all channels that are locally broadcast. These channels are the **programmed channels** and are selected through the **CHANNEL** buttons (▼ or ▲) or through the numerical keypad on the remote control.

Note: This function is automatically disabled when the function "**GAME GUARD**" is active.
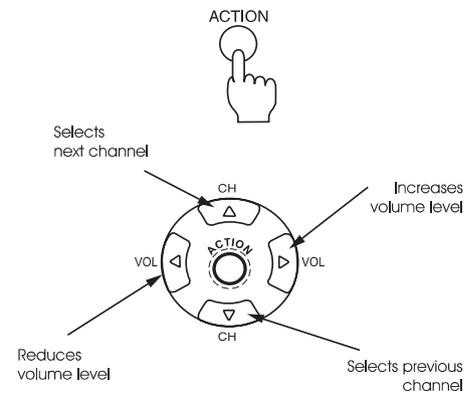
ACTION

Selects
next channel

Increases
volume level

CH

VOL ◁   ▷ VOL

CH

Reduces
volume level

Selects previous
channel

1. Press the **ACTION** button to display the main menu.
2. Use the **CHANNEL** buttons (▼ or ▲) or **VOLUME** buttons (◄ or ►) to select the symbol "**SET-UP**".

3. Press again the **ACTION** button to display the adjustment menu.

```
SETUP

SET TIME              --:--
AUTO POWER ON         OFF
CC MODE               OFF
BLUE BACK
COLOR TEMP            STANDARD
ENGLISH   ESPAÑOL   PORTUGUES
PRESS CH ▼ FOR MORE
```
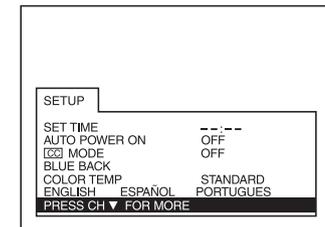
4. Press the button **CHANNEL** (▼) to select the option "**PRESS CH ▼ FOR MORE**", and a second page with options will display.
5. Press the button **CHANNEL** (▼) to select the option "**AUTOMATIC TUNING**".
6. Use the **VOLUME** buttons (◄ or ►) to begin the automatic channel tuning procedure. The channels will display in increasing numerical order, until all broadcast signals for the selected antenna mode are scanned.
7. After the scanning is finished, press the **ACTION** button twice to exit the configuration menu.

Obs.: The numbers of the channels that are properly tuned in will display in blue. The other channels will be hidden, but are accessible directly through the numerical keypad on the remote control unit.

Operation

Manual channel tuning.

This function allows the desired channels to be tuned in manually.

Note: This function is automatically disabled when the function "**GAME GUARD**" is active.
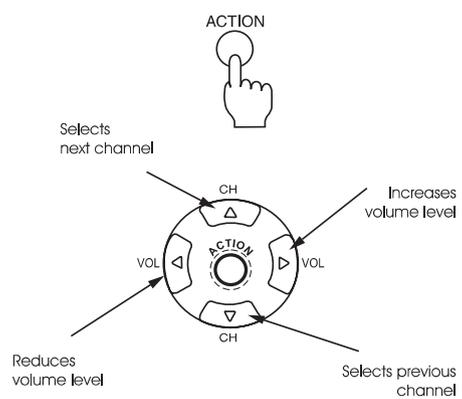
ACTION

Selects
next channel

Increases
volume level

CH
△

VOL ◁   ACTION   ▷ VOL

▽
CH

Reduces
volume level

Selects previous
channel

1. Press the **ACTION** button to display the main menu.
2. Use the **CHANNEL** buttons (▼ or ▲) or **VOLUME** buttons (◄ or ►) to select the symbol "**SET-UP**".
3. Press again the **ACTION** button to display the adjustment menu.

SETUP

SET TIME   -- -- : -- --
AUTO POWER ON   OFF
[CC] MODE   OFF
BLUE BACK
TEMP COLOR   STANDARD
ENGLISH   ESPAÑOL   PORTUGUES
PRESS CH ▼ FOR MORE
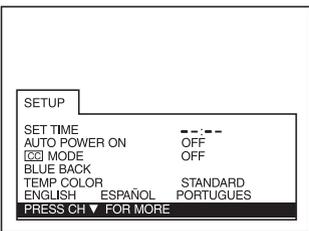
4. Press the button **CHANNEL** (▼) to select the option "**PRESS CH ▼ FOR MORE**", and a second page with options will display.
5. Press the button **CHANNEL** (▼) to select the option "**MANUAL TUNING**".
6. Use the **VOLUME** buttons (◄ or ►) to display the manual tuning menu.
7. Use the **CHANNEL** buttons (▼ or ▲) or the remote control numerical keypad (0 to 9) to select the channels.

▲▼ TO ENTER CHANNEL NUMBER
3

► TO ADD CHANNEL
◄ TO DELETE CHANNEL
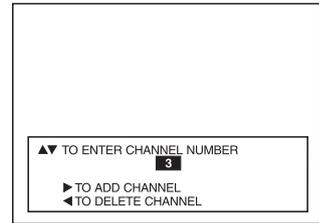
8. Press the button **VOLUME** (►) to store the channel in memory (blue color). Press the button **VOLUME** (◄) to delete the channel from memory (yellow color).
9. Repeat steps 7 and 8 to store or delete channels from memory.
10. Press the **ACTION** button twice to exit the manual tuning menu.

Operation

AUTO POWER ON

For this function to be available, the **POWER** button must be in the **ON** position.

If the TV set is hooked to a cable TV converter which has a power switch, the switch may be used to turn on and off both simultaneously.

Note: When the function "**AUTO POWER ON**" is activated, the functions controlling the **TIMER** and the clock are automatically disabled.
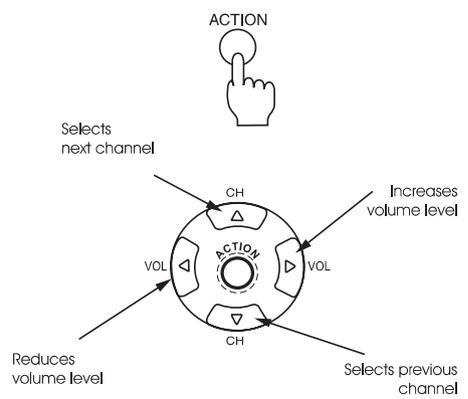
ACTION

Selects
next channel

Increases
volume level

CH
△

VOL ◁   ACTION   ▷ VOL

▽
CH

Reduces
volume level

Selects previous
channel

1. Press the **ACTION** button to display the main menu.
2. Use the **CHANNEL** buttons (▼ or ▲) or **VOLUME** buttons (◄ or ►) to select the symbol "**SET-UP**".

3. Press again the **ACTION** button to display the adjustment menu.

SETUP

SET TIME   -- -- : -- --
AUTO POWER ON   OFF
[CC] MODE   OFF
BLUE BACK   ON
COLOR TEMP   STANDARD
ENGLISH   ESPAÑOL   PORTUGUES
PRESS CH ▼ FOR MORE
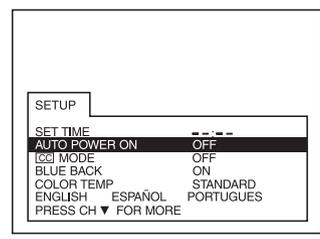
4. Press the button **CHANNEL** (▼) to select the option "**AUTO POWER ON**".
5. Press the button **VOLUME** (►) to select **ON** or **OFF**.

Note: If the TV set is turned off by the **POWER** button (on the remote control) or by the **POWER** or **STAND BY** buttons (both on the TV set), this function is disabled.

Operation

Subtitles display mode "CC MODE"

This feature is used to help hearing-impaired viewers and also in language learning.

This TV set features a built-in decoder that supplies a visual description of the audio track of certain TV programs, displaying the words as subtitles across the screen. This allows the viewer to also read the dialogs in TV programs or other information.

Note: When the subtitles display mode is turned off, the viewer can activate the display by pressing the **MUTE** button on the remote control. Press "**MUTE**" gain to deactivate the function.
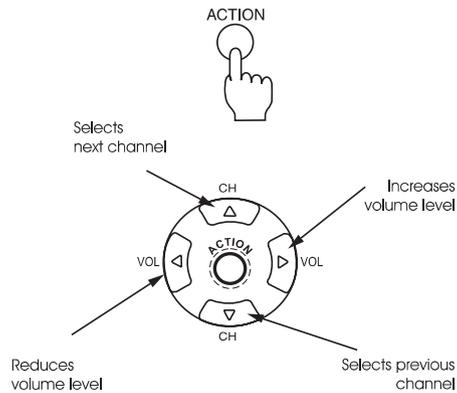
ACTION

Selects next channel
CH
Increases volume level
ACTION
VOL ◄ ► VOL
CH
Reduces volume level
Selects previous channel

1. Press the **ACTION** button to display the main menu.
2. Use the **CHANNEL** buttons (▼ or ▲) or **VOLUME** buttons (◄ or ►) to select the symbol "**SET-UP**".
3. Press again the **ACTION** button to display the adjustment menu.

```
SETUP

SET TIME              --:--
AUTO POWER ON         OFF
CC MODE               OFF
BLUE BACK             ON
COLOR TEMP            STANDARD
ENGLISH   ESPAÑOL     PORTUGUES
PRESS CH ▼ FOR MORE
```
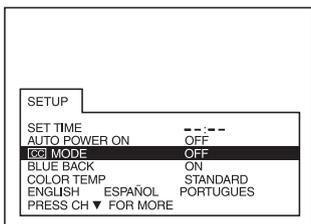
4. Press the button **CHANNEL** (▼) to select the option "CC **MODE**"(subtitles display mode).

5. Press the button **VOLUME** (►) to select "**OFF**" (display disabled). C1, C2, T1, T2, C3, C4, T3, T4.
6. Press the **ACTION** button twice to exit the configuration menu.
- **DISPLAY DISABLED** - The mode is recommended when it is not possible to display subtitles.
- **DISPLAY C1 - C4 : C1 - C4** - are fields which contain information, where each field contains information different from the other. The selection of which field must be used depends on which field is used by the broadcaster to transmit the information. The placement on screen of the information is such as not to disrupt the image. A common example is the display of the words spoken by a news anchorperson.
- **DISPLAY T1 - T4 : idem C1 - C4**, has a different placement of the information: T1 - T4 displays in a black window positioned in the bottom half of the screen, displaying the information corresponding to the selected CC **MODE**". For example, for a soccer game, it may display the players' names.

Note:

For this function to work, the program being watched (video or normal broadcast) must include the information to display the subtitles "CC".

Operation

Channel caption

This feature allows to store in memory the labels for up to 30 channels (maximum 4 characters for each label). As a result, when switching channels or pressing the **RECALL** button, the labels will display on the screen side-by-side the corresponding channel number.
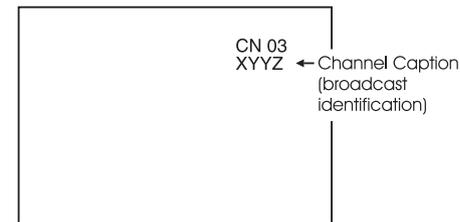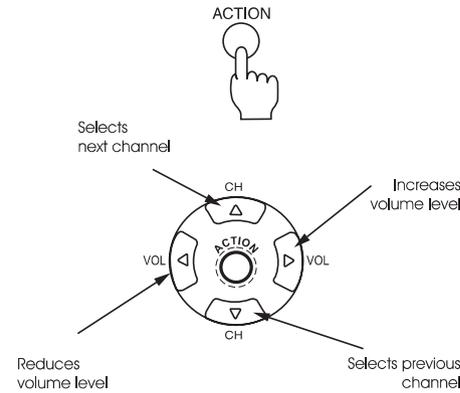
ACTION

Selects next channel
CH
Increases volume level
VOL ◄ ► VOL
ACTION
CH
Reduces volume level
Selects previous channel

```
CN 03
XYYZ  ← Channel Caption
        (broadcast
        identification)
```

1. Press the **ACTION** button to display the main menu.
2. Use the **CHANNEL** buttons (▼ or ▲) or **VOLUME** buttons (◄ or ►) to select the symbol "**CHANNEL CAPTION**".
3. Press again the **ACTION** button to display the **CHANNEL CAPTION** menu.

```
CHANNEL CAPTION

ENTER CHANNEL NUMBER
03
ENTER CAPTION
_ _ _ _

▲ TO MOVE        ◄► TO SELECT
▼ CURSOR             CHANNEL
```
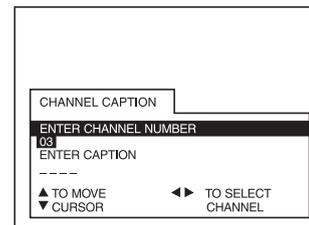
4. Use the **VOLUME** buttons (◄ or ►) (only for channels that have been programmed) or use the numerical keypad on the remote control to enter the number of the channel to be labeled.
5. Press the button **CHANNEL** (▼) to select the option "**ENTER CAPTION**".
6. Use the **VOLUME** buttons (◄ or ►) to select the first character of the channel label.
   Sequentially, press the button **CHANNEL** (▼) to advance the cursor to the second position and repeat the procedure until the label is fully entered (up to 4 characters).
7. Use the **CHANNEL** buttons (▼ or ▲) to select the option "**ENTER CHANNEL NUMBER**"(indicator of the channel number). Repeat steps 4 to 6, to define more channel labels.
8. Press the **ACTION** button twice to exit the channel labeling menu.

Obs.: To delete a channel label from memory, the four label spaces must be empty of any character (_ _ _ _).

Note:

When the maximum number of labels have been stored, the word "FULL" will display in the place of a new label.

Connection

Connecting to an amplifier (stereo equipment)

Terminals (LINE OUT FOR AUDIO AMPLIFIER)

Connect these terminals to the **AUX** input of a stereo amplifier to listen to the stereo sound through the amplifier.

Obs.: The terminals labeled "**P/ AMPLIF. DE AUDIO**" (to the amplifier) cannot be connected to external loudspeakers.

Connect a sound amplifier to the terminals "**P/ AMPLIF. DE AUDIO**" on the TV set, as shown in the illustration below, and follow the steps 1 through 4.

1. Set the amplifier volume to minimum.
2. Set the TV sound volume between 10 and 15.
3. Adjust the sound volume of the amplifier to the desired level.
4. The sound level and the function **MUTE** may be accessed from the remote control unit.
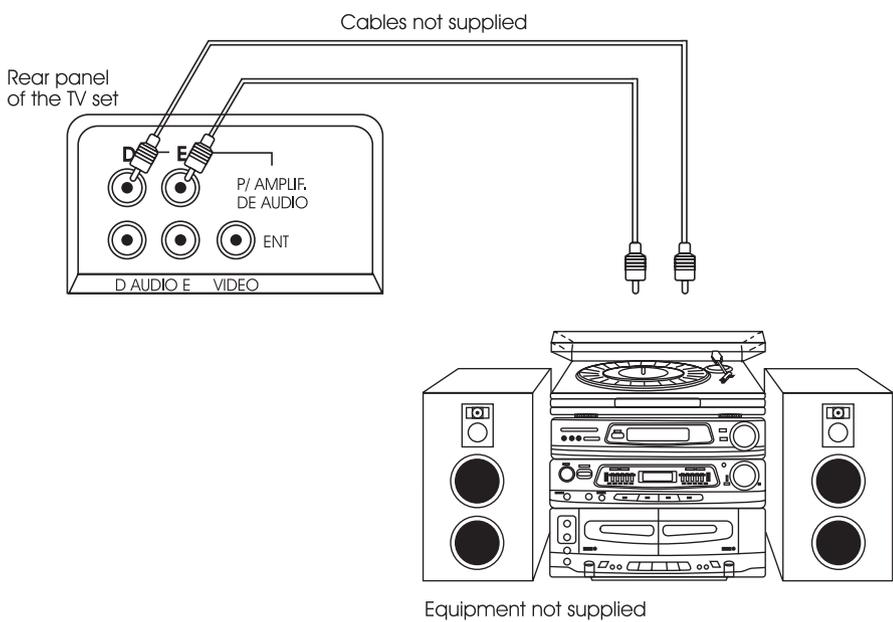
Connection

Connecting to a videocassette recorder (VCR)

To connect to a videocassette recorder proceed as follows:

1. Connect the external equipment, as show in the illustration, to the terminals labeled "**ENT**" (input).
2. Select the video mode by pressing the "**TV/VIDEO**" button on the TV set.
3. Turn on the connected VCR or video disc player according to instructions in their respective manuals.

Observation:

If the VCR is connected to the AV input terminals, press the **TV/VIDEO** button on the TV set to display the VCR output on the screen.

If the VCR is connected to the VHF/UHF terminals, to display the VCR output, select on the TV set the channel corresponding to the video output (3 or 4).

Cables not supplied

Rear panel of the TV set

Equipment not supplied
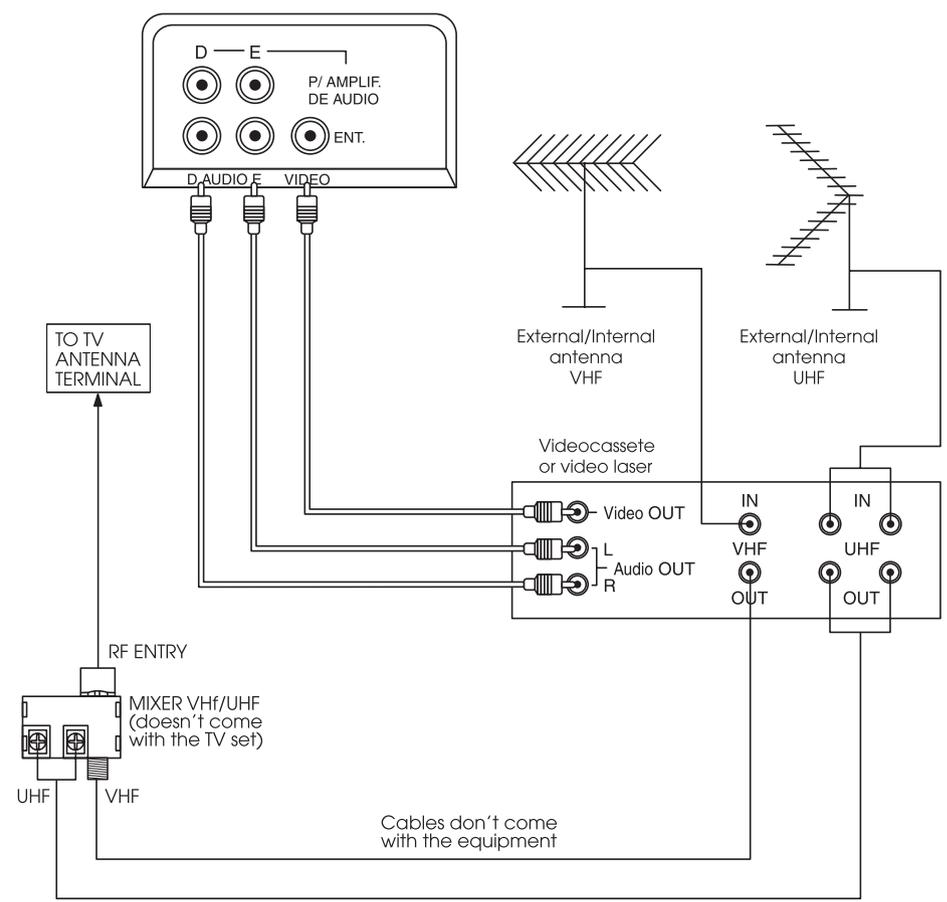
Remote Control Transmitter

Inserting batteries

1. Open the cover of the battery compartment, located on the back of the remote control unit.

2. Insert the batteries in the compartment, paying attention to correct polarities, as shown in the illustration.

3. Close the battery compartment, sliding the cover in place.

Useful Suggestions:

Replace batteries when noticing any failure in the functioning of the remote control unit.

If the remote control is frequently used, we recommend the use of alkaline batteries, with longer life, damage the unit.

Precautions when using batteries

The incorrect insertion of batteries in the compartment can cause leaking and corrosion of metal parts, and may Observe the following precautions:

1. Batteries should be replaced in pairs.

2. Do not mix new and used batteries.

3. Do not mix different types of batteries (for example, carbon-zinc with alkaline batteries).

4. Do not attempt to charge, short-circuit, open, warm up or burn used batteries.

5. Remove the batteries from the unit, if the unit is not going to be used for a long while.

COVER

R6P/R6PU AA IEC R6
R6P/R6PU AA IEC R6
U8SDEC 1190 >PS<

PUSH AND PULL TO OPEN THE COVER OF THE BATTERY COMPARTMENT

AA IEC R6

POLARITY
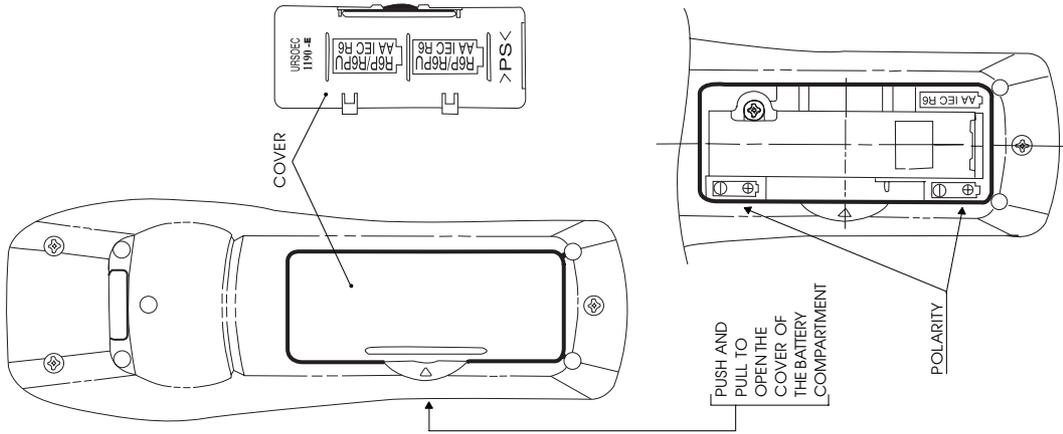
Note:

Once discharged, the batteries included with this product may be disposed off with domestic trash.

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SERVICE MODE

HOW TO ENTER INTO SERVICE MODE:

1. Switch to CATV and set the 124 CATV channel.
2. Adjust minimum volume with the **Vol(−)** button.
3. Adjust **SLEEP** function to 30 and press the button **Vol(−)** on the TV panel.
4. To alter among CHQ's (B0→C0→S0→M0), press **POWER**.
5. To alter among DAC's (B0→B1... and C0→C1...), press **CH(+)** or **CH(−)** and to alter the values press **VOL(+)** or **Vol(−)**.
6. To get access to contents of directions of the memory address shows bellow, set DAC "S 0" and press **MUTE** button on the remote control, for about 3 sec.

TO EXIT SERVICE MODE:

1. Press **ACTION** and ⏻**POWER** button simultaneously, on the TV panel , for about 3 sec.

RESET: Press simultaneously **ACTION** and ⏻**POWER** button for about 5 sec. All programming done (clock, color, color system through channels or signal) will be cover for the original factory adjustments.

INITIAL DATA RECORDING IN THE MEMORY (EEPROM)

1. Initial data must be recording before IC memory installation in the circuit board.
2. The data of "A0" address, is individual for each model. The data of "A2" and "A4" are common to all models.

DATA MEMORY ON THE SCREEN

X Address Table
A0, A2 and A4
  0 1   2

Y Address Column
(First line) 0 - F

Z Address Line
(First Column) 0 - F
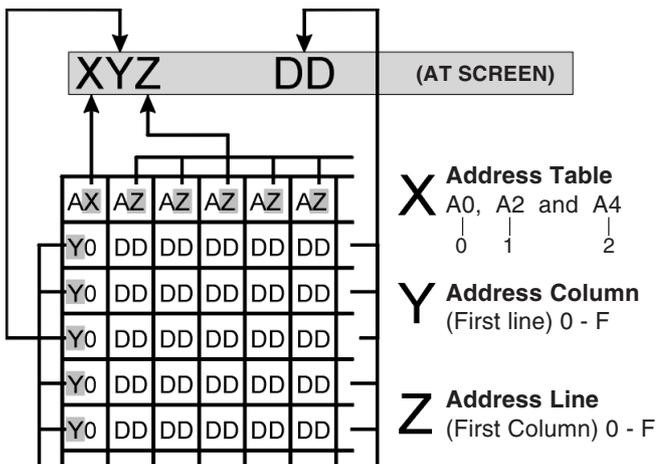
Address A0

| A0	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	00	00	00	00	00	00	00	00	00	00	00	00	00	03	00	00
10	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
30	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
40	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
50	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
60	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
70	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
80	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
90	00	00	00	00	00	00	1F	5A	1F	1F	80	5A	1F	1F	11	00
A0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
B0	5A	5A	17	07	17	07	43	0F	0F	0F	0F	00	01	00	00	50
C0	1A	1A	00	FF	FF	FF	0C	50	02	00	08	40	40	40	80	40
D0	1F	1F	1F	00	00	00	00	00	18	08	3C	3A	70	5A	1F	34
E0	00	00	00	00	00	03	A5	50	50	50	52	02	A5	5A	50	03
F0	00	80	40	09	04	04	00	00	00	00	00	00	0C	50	00	5A

Address A2

A2	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	00	70	70	70	70	00	70	70	70	70	00	70	70	70	70	00
10	70	70	70	70	00	70	70	70	70	00	70	70	70	70	00	70
20	70	70	70	00	70	70	70	70	00	70	70	70	70	00	70	70
30	70	70	00	70	70	70	70	00	70	70	70	70	00	70	70	70
40	70	00	70	70	70	70	00	70	70	70	70	00	70	70	70	70
50	00	70	70	70	70	00	70	70	70	70	00	70	70	70	70	70
60	70	70	70	70	00	70	70	70	70	00	70	70	70	70	70	70
70	70	70	70	00	70	70	70	70	00	70	70	70	70	00	70	70
80	70	70	00	70	70	70	70	00	70	70	70	70	70	70	70	70
90	70	00	70	70	70	70	00	00	00	00	00	00	00	00	00	00
A0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
B0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
C0	00	00	00	00	00	00	00	00	00	00	00	00	54	4B	31	15
D0	84	A4	16	84	2A	8C	87	61	DC	88	92	12	2D	1C	83	95
E0	5F	CA	1A	1D	CB	1A	93	91	72	04	FF	FF	FF	FF	FF	FF
F0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	DC

Address A4

A4	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	1F	1F	1F	3F	24	1F	1F	1F	35	1F	1C	1F	1F	2C	10	1F
10	1F	1F	30	1F	1F	1F	1F	3F	24	1F	1F	1F	35	1F	1C	1F
20	1F	2C	10	1F	1F	1F	30	1F	00	00	00	00	51	00	00	00
30	1F	1F	7F	00	00	00	00	00	00	00	00	00	00	00	00	14
40	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
50	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
60	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
70	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
80	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
90	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
A0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
B0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
C0	00	00	00	00	00	00	00	00	00	00	00	00	54	4B	32	78
D0	3A	12	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
E0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
F0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	AF

ELECTRICAL INSPECTIONS

REQUIRED EQUIPMENTS / CONNECTIONS:
Voltmeter 150VDC: between C809 (+) and Ground HOT(-).
RMS Voltmeter: CRT Heater Terminal.

PROCEDURE:
1. Apply a PHILIPS pattern.
2. Adjust AC supply to 110 or 220 V. Adjust BRIGHT and CONTRAST control until get a totally black screen. The DC Voltmeter must be 130V±2.5V.
3. The heater terminal voltage must be:
   TC-20G12P→6,15V+0.40Vrms −0.24Vrms
   TC-29G12P/TC-29G12PU→6,3V+0.40Vrms −0.24Vrms

DEFLECTION CIRCUIT PRE-ADJUSTEMENTS

REQUIRED EQUIPMENTS / CONNECTIONS:
Voltmeter (50KV): Connect between CRT anode and CRT DAG GROUND.

PROCEDURE:
1. Apply a PHILIPS pattern.
2. Adjust VERTICAL HEIGHT (DAC B:5) until get a circle.
3. Apply a CROSSHATCH pattern.
4. Adjust BRIGHT and CONTRAST control until get a totally black screen. The voltage on Voltmeter must be:
   TC-20G12P→26,25kV±1,25kV
   TC-29G12P/TC-29G12PU→29,1kV+1.4kV−1.5kV
5. Apply a PHILIPS pattern and readjust the BRIGHT and CONTRAST control to get a correct image picture.
6. Adjust the HORIZONTAL CENTER ("Cc" register) until the image is correctly centered.

To **TC-29G12P** and **TC-29G12PU** only:
7. Confirm that the horizontal width is in normal range.
8. Correct E-W Pincushion by adjusting R761 in the Z-PCB.
9. Correct the horizontal width by adjusting R760 in the Z-PCB.

AGC CIRCUIT PRE-ADJUSTMENTS

REQUIRED EQUIPMENTS / CONNECTIONS:
Oscilloscope: TP2.

PROCEDURE:
1. Apply a 63dB±2dB pattern signal (75Ω open) (Using a high VHF channel 7 ~ 13).
2. Set the CONTRAST control on center position.
3. Verify the CONTRAST variation with SUB-CONTRAST (DAC B:3) to get a 3.0Vp-p wave form on the oscilloscope at TP2.

3Vp-p
Excluding the eraser part
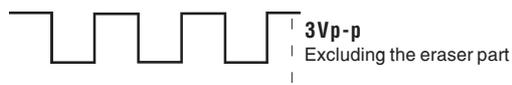
4. Verify if snow appear when the RF AGC register (DAC:Ca) is decreased. Then increase it slowly until the snow has disappeared.

WHITE BALANCE ADJUSTMENTS

REQUIRED EQUIPMENTS / CONNECTIONS:
Oscilloscope: Connect to CRT board "GK" and ground.

PREPARATION:
1. Get turn ON the equipment for about 15 minutes.
2. Set standard WHITE BALANCE.
3. Adjust the image mode to "DYNAMIC".
4. Fix the COLOR adjust in "NORMAL".
5. Fix the CONTRAST adjust in "NORMAL".
6. Enter in the service mode.
7. Adjust CUT OFF and DRIVE DATA to:

   C0: CUT OFF_R= 0_64
   C1: CUT OFF_G= 0_128
   C2: CUT OFF_B= 0_64
   C3: DRIVER_R= 64
   C4: DRIVER_B= 64

8. Adjust SCREEN VR to minimum.
9. Connect the oscilloscope.

PROCEDURE:
1. In Service Mode, press "R-TUNE" on remote control to enter in the Horizontal Line mode.
2. Look (GK) on the oscilloscope, then adjust SUB-BRIGHT (DAC:B2) until the raster period be as the draw bellow.

GK waveform

TC-20G12P = 160VDC
TC-29G12P = 195VDC
TC-29G12PU = 195VDC
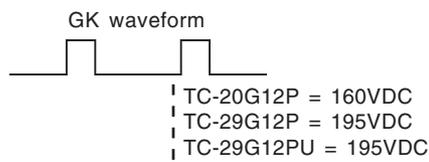
3. Adjust SCREEN VR to the first line stayed lightly illuminated.

   Note: After adjust, the SCREEN VR doesn't must be moved.

4. Adjust CUTT OFF to the horizontal line become white. (R,B CUT OFF) (DAC: C0) (DAC: C2).
5. Press again "R-TUNE" to exit of Horizontal Line mode.
6. Get appropriate White Balance moving the REC drive (DAC: C3) and BLUE drive (DAC: C4).
7. Apply a PHILIPS pattern.
8. Get a normal image adjusting CONTRAST, BRIGHT and FOCUS VOLUME controls. Then confirm the image doesn't show serious convergence loss.

AFT ADJUSTMENTS

REQUIRED EQUIPMENTS / CONNECTIONS:
Digital Voltmeter, C.W. generator (45.75 Mhz) and VIF HEAD.
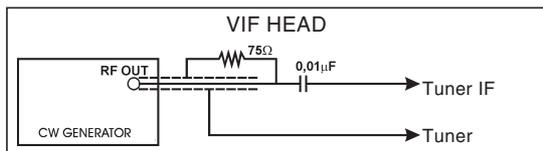
PREPARATION:
1. Disconnect antenna.
2. Connect the generator at TP37, using VIF HEAD.
3. Connect a jumper between TP8 (RF AGC) and GND.
4. Connect the Voltmeter between TP16 (AFT) and GND.
5. Turn On the TV.

PROCEDURE:
1. Adjust AFT (DAC: C9) to "128".
2. Adjust the AFT coil (L167) until the Voltmeter on TP16 show 2.5±0.1V.
3. Turn On the generator, and move the output signal between 45,650Mhz and 45,850Mhz. Check the Voltmeter on TP16 must be indicate a variation biggest 0.4V.
4. Remove the jumper, disconnect the Voltmeter and THE CW Generator.
   Note: To C.W.Generator the standard frequency is 45,75Mhz, the signal TV level is 90dBµV to 75O.

+B VOLTAGE VERIFICATION

REQUIRED EQUIPMENTS / CONNECTIONS:
Digital Voltmeter   (+): according relation below.
                    (−): GND (HOT)

PROCEDURE:
1. Adjust BRIGHT and CONTRAST control until get a totally black screen.
2. Do the medition relationed below:

VOLTMETER (+)	20 inches	29 inches
C865(+)	130VDC	130VDC
TP29	24V±2VDC	27,4V±2VDC
TP30	13V±2VDC	13V±2VDC
C859(+)	18V±2VDC	18V±2VDC
TP5	9V±0,5VDC	9V±0,5VDC
TP34	200±15VDC	220±15VDC
TP11	5±0,25VDC	5±0,25VDC
C861	12,5±0,5VDC	12,5±0,5VDC

3. Return the BRIGHT and CONTRAST adjusts to the normal image.

RF AGC ADJUSTMENT

REQUIRED EQUIPMENTS / CONNECTIONS:
Digital Voltmeter: TP8 the AGC Tuner terminal.

PROCEDURE:
1. Apply a COLOUR BAR pattern of 63±2dB (75Ω open) in the antenna terminal.
   (Using a high VHF channel 7 ~ 13).

CHANNEL	7	8	9	10	11	12	13
MHz	175,25	181,25	187,25	193,25	199,25	205,25	211,25

2. Confirm a normal image.
3. Check if the noises disappear when the RF AGC register (DCA:Ca) is decreased and note the reference voltage. Confirm if the noise appear when the register is increased.
4. Increase slowly the AGC register (DAC: Ca) until the TP8 voltage get a reference voltage less of 0.2V (maximum voltage)
5. Check if the RF AGC voltage (reference voltage) falls more then 0.3V when the input is increased 2dB.

IF DETECTOR OUTPUT ADJUSTMENT

REQUIRED EQUIPMENTS / CONNECTIONS:
Oscilloscope: Connect to TP12.

PROCEDURE:
1. Apply a COLOURBAR pattern of 100IRE level.
2. Adjust the output detection (DAC:Ce) (including the SYNC signal) inside of 1.0 ±0.1Vpp range
3. Check if the SYNC amplitude signal (SYNC "S" & output detection "P" ratio) is inside of 30±5% range.
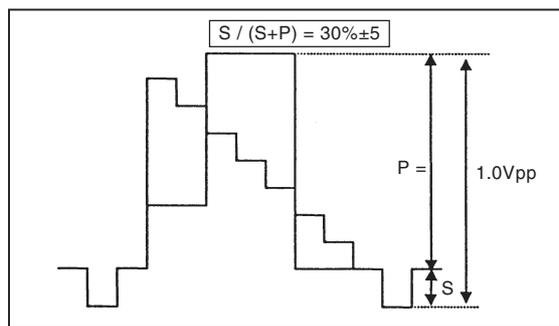
Note: The RF signal ratio modulation is 87.5% ~ 90%.

SUB-CONTRAST ADJUSTMENT

PREPARATION:
1. Picture MenU   DYNAMIC
2. CONTRAST   Max. or Normal
3. BRIGHT   Center or Normal
4. SHARPNESS   Center or Normal
5. COLOR   Center or Normal

REQUIRED EQUIPMENTS / CONNECTIONS:
Oscilloscope bigger than 5MHz: Connect to TP2 or TP35.

PROCEDURE:
1. Position a jumper between TP38 and GND (COLD).
2. Apply a COLOURBAR pattern with 100IRE level.
3. Adjust the SUB-BRIGHT (DAC:B2) to that black level can't be compressed.
4. Adjust the SUB-CONTRAST (DAC:B3) to obtain [**A**] between black level and white level on TP2 (E-board) or TP35 (Y-board).

White level (100 IRE)

TC-20G12P [**A**]=3,6±0,1Vp-p
TC-29G12P [**A**]=3,2±0,1Vp-p
TC-29G12PU [**A**]=3,2±0,1Vp-p

Black level
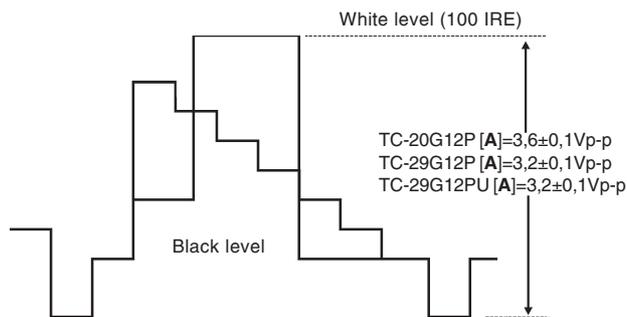
5. Remove the jumper on TP38

PAL SUB-COLOR ADJUSTMENT

REQUIRED EQUIPMENTS / CONNECTIONS:
Oscilloscope: Connect to TP2 .

PREPARATION:
1. Picture Menu   DYNAMIC
2. CONTRAST   Max. or Normal
3. BRIGHT   Center or Normal
4. SHARPNESS   Center or Normal
5. COLOR   Center or Normal

PROCEDURE:
1. Position a jumper between TP38 and GND (COLD)
2. Apply a COLORBAR pattern.
3. Check if the image is on DYNAMIC mode.
4. Adjust the SUB-BRIGHT (DAC: B2) to [A] of threshold level to the wave form doesn't be compressed.
5. Adjust the SUB-COLOR (DAC: B0) to obtain [**B**] as showed below.

TC-20G12P [**B**]=3,2±0,05Vp-p
TC-29A12P [**B**]=2,7±0,05Vp-p
TC-29G12PU [**B**]=2,7±0,05Vp-p

[A]
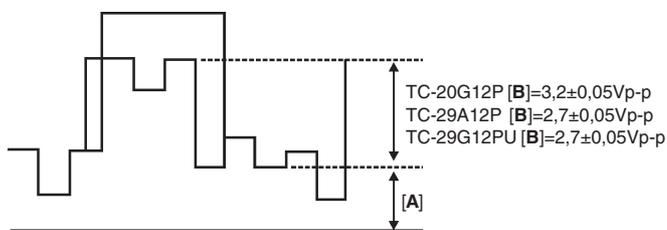
6. Remove the jumper on TP38

NTSC SUB-TINT ADJUSTMENT

REQUIRED EQUIPMENTS / CONNECTIONS:
Oscilloscope: Connect to TP1 (E-board) or (Y-board)

PREPARATION:
1. BRIGHT   Center or Normal
2. COLOR   Center or Normal
3. TINT   Center or Normal
4. CONTRAST   Max. or Normal
5. COLOR SYSTEM   AUTO or NTSC

PROCEDURE:
1. Position a jumper between TP38 and GND (COLD)
2. Apply a Rainbow pattern.
3. Adjust the SUB-TINT (DAC: B1) to get, on TP1 or TP36 a waveform like showed below
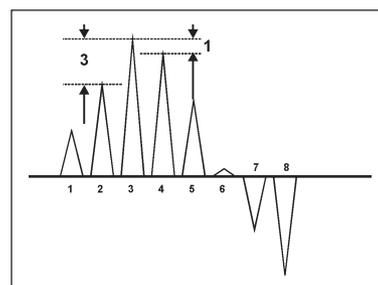
4. On user mode, check that the TINT control move the phase TINT more than ±30°.

SUB-BRIGH PRE-ADJUSTMENT

PREPARATION:
1. SYSTEM MODE   NTSC or Auto
2. COLOR   Center or Normal
3. CONTRAST   Max. or Normal
4. BRIGHT   Center or Normal

PROCEDURE:
1. Apply a standard SUB-BRIGHT (DAC: B2) to the center of PART 6 and PART 7 became black.
   (PART 7=Black and PART 6=Lightly Illuminated)

10 ......7 ....5 ....3 1

7   7

1 ......3 ....5 ..7 ..10

6   7
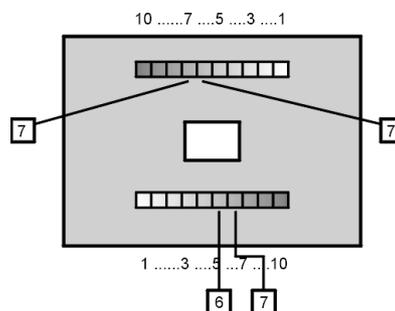
AUDIO OUTPUP LEVEL VERIFICATION

REQUIRED EQUIPMENTS / CONNECTIONS:
JIG Filter: TP18.
RF signal generator: RF antenna input.
RMS Voltmeter: Between JIG Filter and GND.
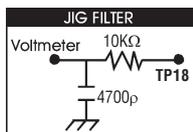
PROCEDURE:
1. Apply the next signals on the antenna input:
      Video: 100 IRE Flat Field, 30% modulation.
      Audio: 300Hz, 100% modulation, mono
                 (70±5dB, 75Ω open, P/S 10dB)
2. Check the Audio level to the

    RMS Voltmeter show 150^{+60}_{-30} mVrms.

MTS CIRCUIT ADJUSTMENT

The MTS Circuit adjust of BR2L chasis, is doing through
four steps:
1. VCO Stereo adjustment.
2. Filter adjustment.
3. Input level adjustment.
4. Stereo separation adjustment.
Note: The adjustment must be done in the sequence
         showed before. VIF, TP12 (Level Detector) must be
         adjusted before MTS adjustment.

STEP 1 – VCO STEREO ADJUSTMENT

REQUIRED EQUIPMENTS / CONNECTIONS:
1KΩ resistive jumper: Connect between the TP14 and GND.
22µF 16V capacitive jumper: Connect between the TP18
(MPX in). and GND.
Frequency Counter: Connect between the TP22 (R-OUT) and
GND.

PROCEDURE:
1. Remove the antenna.
2. On the service mode, select "DAC: M1"
3. Adjust MTS STEREO PLL VCO "DAC: M1" until the
    frequency   counter   show   15.734KHz±50Hz.
    (15.684~15784KHz).
Note: The TV must be turn ON minimum 15 minutes before
         adjustment.

STEP 2 – FILTER ADJUSTMENT

REQUIRED EQUIPMENTS / CONNECTIONS:
RF Generator: Antenna input (RF)
Oscilloscope: Between TP21 (L-out) and GND.
RMS meter: Between TP18 (MPX-in) and GND.

Note: The GND of oscilloscope must be next of IC2201-01
         terminal for minimum noise.

PROCEDURE:
1. Apply the next signal to antenna input (RF):
    Video: 100 IRE Flat Field, Modulation 30%.
    Audio: 15.734KHz sinusoidal wave.
    (70±5dB, 75Ω open, P/S 10dB).
2. Adjust the output level signal generator for that a
    15.734KHz wave form be 100 ±5mVrms on TP18.
3. On service mode, adjust "DAC: M2".
4. Adjust MTS filter (DAC:M2) until the wave form
    amplitude, on oscilloscope screen be minimum.

STEP 3 – INPUT LEVEL ADJUSTMENT

REQUIRED EQUIPMENTS / CONNECTIONS:
JIG Filter: Connect to TP22.
RF generator: Connect to RF input antenna terminal.
RMS meter: Between JIG Filter and GND.
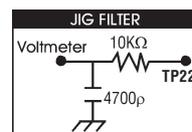
PROCEDURE:
1. Apply the next signal on antenna input (RF):
    Video: 100 IRE Flat Field, Modulation 30%.
    Audio: 300 Hz, modulation 100%, mono.
    (70±5dB, 75Ω open, P/S 10dB).
2. On service mode, adjust "DAC: M0"
3. Adjust the input level MTS (DAC: M0) until the Voltmeter
    show 212 ± 10.5mVrms.

STEP 4 – STEREO SEPARATION ADJUSTMENT

REQUIRED EQUIPMENTS / CONNECTIONS:
RF generator: Antenna input (RF).
Oscilloscope: Between TP22 (R-out) and GND.

PROCEDURE:
1. On audio MENU set STEREO.
2. Apply the next signal on antenna input (RF):
    Video: 100 IRE Flat Field, Modulation 30%.
    Audio: 300 Hz, modulation 100%, stereo (L channel)
    (70±5dB, 75Ω open, P/S 10dB).
3. Adjust the low level separation (DAC: M3) until the wave
    form amplitude on the oscilloscope screen, be minimum.
4. Adjust the audio of RF generator to 3KHz.
5. Adjust the high level separation (DAC: M4) until the wave
    form amplitude on the oscilloscope screen, be minimum.
6. Repeat steps 2 to 4.

HUM VERIFICATION

REQUIRED EQUIPMENTS / CONNECTIONS:
JIG filter: Connect between the speaker's terminals.
Oscilloscope: Connect between the JIG Filter and GND.
Function Tester: Connect to PC-Board.
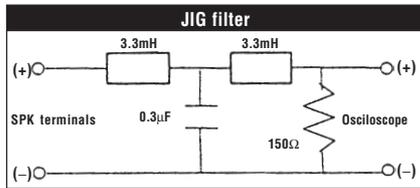
PREPARATION:

1. VOLUME   Max.
2. AI SOUND   OFF
3. SPEAKER SW   ON

PROCEDURE:

1. Apply a COLORBAR pattern without audio modulation (70±5dB, 75Ω open, P/S 10dB)
2. Check if the hum level is less then 1.5Vp-p
3. When the hum level be bigger 1.5Vp-p, use the JIG filter and check if the hum level is less that 0.5Vp-p

HUM level

AUDIO OUTPUT CHECK UP

REQUIRED EQUIPMENTS / CONNECTIONS:
RMS Voltmeter:
Input Cable: VAO "L" and "R" Terminals.
Ground Cable: GND.

PREPARATION:

1. VOLUME   Maximum
2. AI SOUND   OFF
3. SPEAKER SW   OFF

PROCEDURE:

1. Apply a 7.5KHz standard audio signal modulated with 1KHz, and 30% deviation.
2. Check if the RMS Voltmeter shows a voltage 430±150mVrms between "L" and "R" terminals.

SYNTHETIZER ADJUSTMENTS

REQUIRED EQUIPMENTS / CONNECTIONS:
Frequency Counter: TP42 – GND

PREPARATION:

1. CLOCK CORRECTION   128 (DAC: S0)

PROCEDURE:

1. Measure TP42 for period.
2. Adjust the register (DAC:S0) based in the next formula:

$$(DAC: S0)=128+0.901 \times 10^6 \{1-1/(244.1406 \times TP42)\}$$

3. Or measure TP42 for frequency.
4. Adjust the register (DAC: S0) based in the next formula:

$$(DAC: S0) =128+0.901 \times 10^6 \{(244.1406-TP42)/244.1406\}$$

DEFLECTION CIRCUIT CHECKUP

REQUIRED EQUIPMENTS / CONNECTIONS:
Voltmeter (50KV): Connect to CRTanode.

PREPARATION:

1. CONTRAST   Minimum
2. BRIGHT   Minimum

PROCEDURE:

1. Apply a BRIGHT pattern and adjust SCREEN and BRIGHT until the back-line disappear
2. Check if the high voltage is [**A**].
   - **TC-20G12P**   [**A**] = 26,25±1,25kV
   - **TC-29G12P/TC-29G12PU**   [**A**] = 29,25±1,25kV
3. Return the SCREEN and BRIGHT adjust to original positions.
4. Apply a CROSSHATCH pattern.
5. Check exist vertical and horizontal lines distortions when the user contrast adjust is on the maximum, while the black level is optimized with the crosshatch bright signal.

DEFLECTION CIRCUIT ADJUSTMENT

The deflection circuit adjust of chassis BR1L/BR1D is done in four steps:

1. H-CENTER
2. H-WIDE
3. V-HEIGTH
4. V-CENTER

STEP 1 – H-CENTER ADJUSTMENT

PROCEDURE:

1. Apply a MONOSCOPE pattern.
2. Adjust CONTRAST on maximum, and BRIGHT on center.
3. Adjust the horizontal center (DAC:Cc) to center PHILIPS pattern on the CRT.

STEP 2 - HORIZONTAL WIDE ADJUSTMENT
PROCEDURE:
1. Apply a MONOSCOPE pattern.
2. Adjust the horizontal register center (DAC: Cc) until the correctly image centralization.
3. Check if the horizontal wide is 2.25±0.25, according showed below.

To **TC-29G12P** and **TC-29G12PU** only:
4. Confirm that the horizontal width is in normal range.
5. Adjust E-W Pincushion to correct the horizontal width.
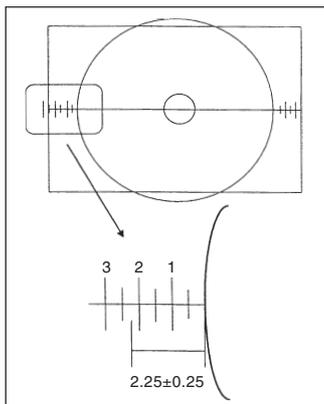
3 2 1

2.25±0.25

STEP 3 – V-HEIGTH ADJUSTMENT
PROCEDURE:
1. Apply a PHILIPS pattern.
2. Adjust CONTRAST on maximum, and BRIGHT on center.
3. Adjust (DAC: B5) to the correct vertical size doing that the PHILIPS pattern get a circle form.
4. Apply a PHILIPS pattern.
5. Check if exist Raster Slacking on the display.

STEP 4 – V-CENTER ADJUSTMENT
PROCEDURE:
1. Apply a PHILIPS pattern.
2. Adjust CONTRAST on maximum, and BRIGHT on center.
3. Adjust the vertical center (DAC:B6) to center PHILIPS pattern on the CRT.

CRT CUT OFF ADJUSTMENT

REQUIRED EQUIPMENTS / CONNECTIONS:
Oscilloscope: Between GK and GND (CRT Board).

PREPARATION:
1. The TV must be turn ON minimum 15 minutes before adjustment.
2. Apply a White Balance pattern.
3. Adjust the image mode to "DYNAMIC".
4. Adjust COLOR and CONTRAST to "NORMAL".
5. Enter in the service mode.
6. Adjust CUT OFF and DRIVE DATA to:
   C0: CUT OFF _R=0_ 64
   C1: CUT OFF _G=0_ 128
   C2: CUT OFF _B=0_ 64
   C3: DRIVER_R=64
   C4: DRIVER_B=64

7. Adjust SCREEN VR to minimum.
8. Connect the Oscilloscope.

PROCEDURE:
1. On service mode, press "R-TUNE" on remote control to enter to horizontal line mode.
2. See (GK) on the oscilloscope screen, then adjust SUB-BRIGTH (DAC: B2) to raster period be as showed below.

GK waveform

TC-20G12P = 160VDC
TC-29A12P = 195VDC
TC-29G12PU = 195VDC
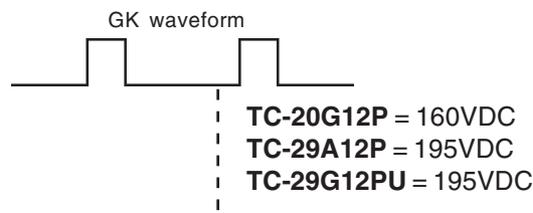
3. Adjust SCREEN VR to the first line stayed lightly lighted.
Note: After adjusted, SCREEN VR doesn't must be altered.
4. Adjust CUT OFF to the horizontal line become white. (R, B CUT OFF)(DAC: C0)(DAC: C2).
5. Press "R-TUNE" again to exit of horizontal line mode.
6. Get the correct White Balance altering the RED drive (DAC: C3),and BLUE drive (DAC: C4).
7. Apply a PHILIPS pattern.
8. Get a normal image adjusting the CONTRAST, BRIGHT and FOCUS VOLUME. Then check the image haven't convergence loss.

WHITE BALANCE ADJUSTMENT

Note: The CRT CUT OFF adjust must be done before that White Balance adjust.

EQUIPMENTS:
White Balance Meter and Helm Holts Device.

PREPARATION:
1. The TV must be turn ON minimum 30 minutes before adjustment.
2. Check have done the CUT OFF adjust before.
3. Helm Holts Device must be adjusted to the local magnetic field.
4. Apply a White Balance pattern.
5. Set PICTURE MODE to DYNAMIC.
6. Adjust CONTRAST to maximum and COLOR to normal.
7. DEGAUSS on the CRT screen.
8. Install the White Balance Meter on the CRT screen.
9. Be sure that there are not other light source in the ambient.
10. Enter on the Service Mode.

PROCEDURE:
1. Set standard window to under side White Balance Meter. Adjust the low light of "G" to 50µ A, using SUB-BRIGTH (DAC: B2).
2. Then ,adjust the low light of "R" (DAC: C0) and the "B" (DAC: C2), to zero on the White Balance Meter.

3. Set the White Balance pattern to over side the White Balance Meter. Adjust the "G" high light to 80μA by changing SUB-BRIGHT (DAC: B2). If can not get 80μA, connect a jumper through the cable between TP38 and TP41.
4. Then, adjust the "R" high light (DAC: C3) and the "B" (DAC: C4) to zero on the White Balance Meter.
5. If the indication of the high light adjust on White Balance Meter still doesn't get 80μ A, adjust the bright control to the maximum.
6. Check the White Balance Meter under side , if it isn't property , readjust the low light on standard window.
   If the error of "R" is ± 5μ A and "B" is 10μ A repeat the procedure 1 and 2.
7. Exit to the normal mode.

Note: Adjust the White Balance using equipment adjusted to colour temperature 10.800K° + 19MPCD.

COLOR KILLER VERIFICATION

PREPARATION:
1. Adjust the color control to level "50".

PROCEDURE:
1. Apply a pattern signal with 40dB.
2. Verify to not appear color noises on any B/W channel.
3. Verify that the color doesn't disappear on any color channel.

FILAMENT VOLTAGE CHECK UP

REQUIRED EQUIPMENTS / CONNECTIONS:
RMS Voltmeter: CRT filament terminal.

PROCEDURE:
1. Apply crosshatch pattern.
2. The filament voltage must be:
   TC-20G12P→6,15V+0.40Vrms −0.24Vrms
   TC-29G12P/TC-29G12PU→6,3V+0.40Vrms −0.24Vrms

SUB BRIGHT ADJUSTMENT

PREPARATION:
Adjust CONTRAST to maximum and BRIGHT to center.

PROCEDURE:
1. Apply standard SUB BRIGHT.
2. Adjust SUB BRIGHT (DAC: B2) to the central part of PART 6 and PART 7 become black.
   (PART 7=Black and PART 6=lightly illuminated).
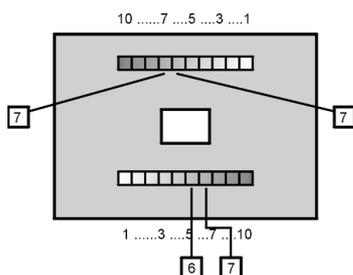
FOCUS ADJUSTMENT

PREPARATION:
1. Adjust CONTRAST to maximum and BRIGHT to center.

PROCEDURE:
1. Apply a MONOSCOPE or PHILIPS pattern.
2. Adjust the focus to the right side of draw below be best.
3. Adjust the focus, first on the center, and after on the "4" region.
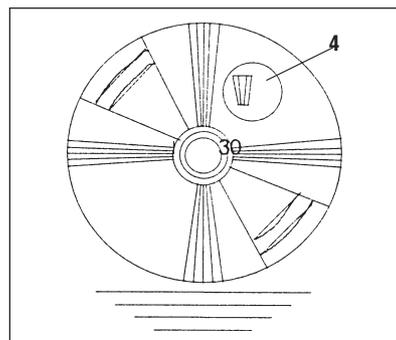
AUDIO VERIFICATION

PREPARATION :
1. VOLUME   1/3 of maximum
2. TV SPEAKER SW   ON

PROCEDURE:
1. Set a music or a external signal.
2. Move the volume control since minimum to maximum and verify if the change is soft.
3. Disconnect the speakers switch and verify if exist still sound on speakers.

AI SOUND VERIFICATION

REQUIRED EQUIPMENTS / CONNECTIONS:
RF Generator: Input antenna terminal
RMS Voltmeter: TP83
PREPARATION:
1. AI SOUND   ON
2. VOLUME   MAXIMUN

PROCEDURE:
1. Apply standard pattern with 1KHz audio modulated and 25KHz with 100% deviation.
2. Check if the output is : 240 ± 100mVrms.

PURITY AND CONVERGENCE ADJUSTMENTS

Adjustment is necessary only if the CRT or the deflection yoke is replaced or if the setting was disturbed.

1.　When the Yoke or the CRT are substituted:

1.1- Position the deflexion yoke and the convergence ring at the neck of the CRT.

1.2- Position the convergence ring as figure below:
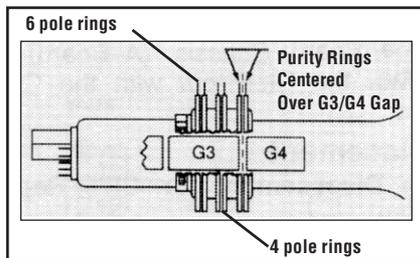
1.3- Turn on the TV set and tune on a red pattern

1.4- Position the deflection coil to obtain an uniform red at the screen.

1.5- Enter service mode and press **RECALL** at the remote control to begin purity adjustment mode.

1.6- Leave the set heating up for 30 seconds at white screen.

2.　Primary adjustment of estatic convergence (centering)

2.1- Connect a crosshatch generator to the set and tune in signal. Observe misconvergece at center of the screen only.

2.2- Adjust the 4 pole magnet (center rings); separate tabs and rotate to converge blue with red.

2.2- Adjust the 6 pole magnet (rear rings); separate tabs and rotate to convergence blue and red (magenta) with green.
Note: Precise convergence at this point is not important.

3-　Purity Adjustment

3.1- Position TV set with screen pointed to the east

3.2- Fully degauss the receiver by using an external degaussing coil.

3.3- Press the **RECALL** button on the Remote Control again until the Purity Check (red screen) appears.

3.4- Move away the deflection coil and adjust rings 1 and 2 in a way that the red portion stay exactly centered in equal proportions to blue and green. (figure below):
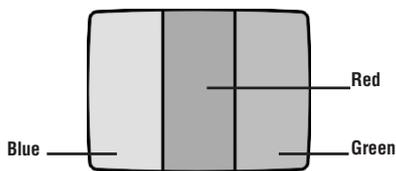
3.5- Slowly move the deflection coil forward until an uniform red is obtained completing the whole screen.

3.6- Fix the deflection coil in place

3.7- Keep **RECALL** button pressed at the remote control and verify the purity of colours green, blue and white. Recheck for purity and readjust if necessary.

4-　Adjustment of estatic convergence

4.1- Apply a crosshatch standard signal.

4.2- Overcome the red line to blue adjusting the rings 1 and 4 (adjust center).

4.3- Overcome the red and blue lines with green adjusting the rings 5 and 6 (adjust center).

5-　DYNAMIC CONVERGENCE ADJUSTMENT

5.1- Move the DY on a horizontal and vertical way simultaneously, to obtain a perfect side colour overcome.

5.2- Adjust the DY position for the image to stay symmetrical in relation to the geometry of the screen.

5.3- Position the rubber parts to keep the DY in place.

5.4- If necessary, use permalloy to correct convergence on the corners.
Note: To position the rubber parts (skids) to the DY, keep an angle of 120 degrees between each part as is shown on figure below:
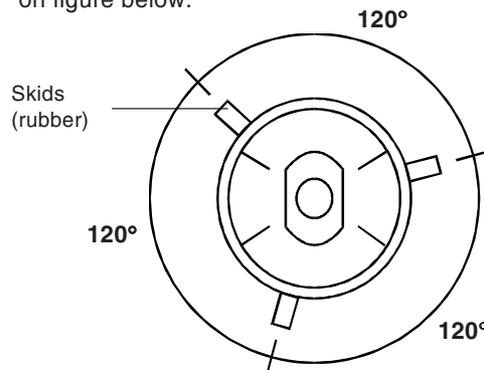
5.5- If necessary use permalloy to correct convergence on the corners.

5.6- Put procedure 3.7 into action.

5.7- Exit Service Mode.

VERIFY PURITY ADJUSTMENT WITH THE HELP OF A MICROSCOPE

1- Apply a white standard signal.

2- Using a microscope, observe the pixel with a correct format, adjust the purity rings.
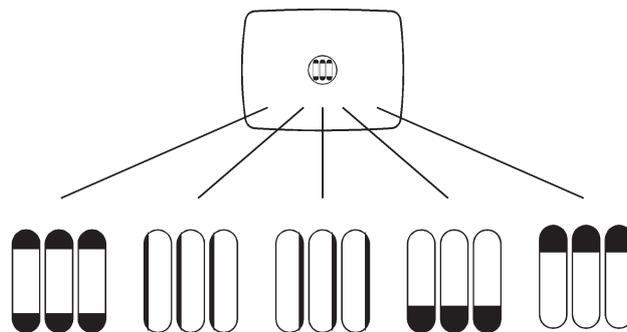
3- Using a microscope, observe the pixel on the sides of the screen and compare figure below. To obtain a pixel with a correct format, adjust the deflector coil moving forward and back.
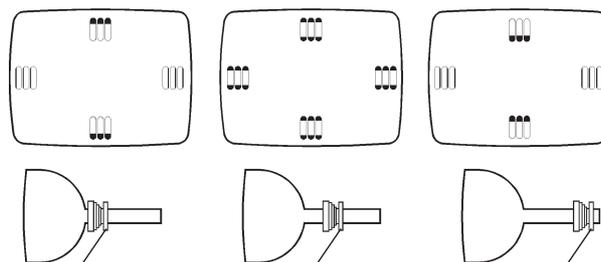
Standard DAC table

Item	DAC	Range	Par	Memory		Item	DAC	Range	Par	Memory
B0	SUB COLOR	0 - 127	60	0DA		C8	B-DRIVE (cool)	0 - 127	15	0BA
B1	SUB TINT	0 - 127	58	0DB		C9	AFT	0 - 255	128	0F1
B2	SUB BRIGHT	0 - 255	112	0DC		Ca	RF AGC	0 - 127	64	0F2
B3	SUB CONTRAST	0 - 127	90	0DD		Cb	RF AGC offset	0 - 15	9	0F3
B4	SUB SHARPNESS	0 - 31	[xx]	0DE		Cc	H-CENTER	0 - 15	6	0CA
B5	V-SIZE	0 - 127	80	0C7		Cd	H-CENTER offset	0 - 15	4	0F4
B6	V-CENTER	0 - 7	2	0C8		Ce	VIDEO OUT GAIN	0 - 7	4	0F5
B7	V-CENTER offset	0 - 3	2	0EB						
C0	R CUT OFF	0 - 511	64	0CF/0C9		S0	CLOCK ADJUST	0 - 255	128	09A
C1	G CUT OFF	0 - 511	128	0CE/0C9		S1	LOUDNESS COMP	0 - 63	52	0DF
C2	B CUT OFF	0 - 511	64	0CD/0C9						
C3	R DRIVE	0 - 127	64	0CC		M0	INPUT LEVEL	0 - 63	31	096
C4	B DRIVE	0 - 127	64	0CB		M1	STEREO PLL VCO	0 - 63	31	098
C5	R-DRIVE (warm)	0 - 127	15	0B7		M2	FILTER	0 - 63	31	099
C6	B-DRIVE (warm)	0 - 127	15	0B8		M3	LOW LEVEL SEP	0 - 63	31	09C
C7	R-DRIVE (cool)	0 - 127	15	0B9		M4	HIGH LEVEL SEP	0 - 63	31	09D

[xx] B4 SUB SHARPNESS: **TC-20G12P** = 31 / **TC-29G12P** = 28 / **TC-29G12PU** = 28

Z-board (Pincushion) - Schematic Diagram
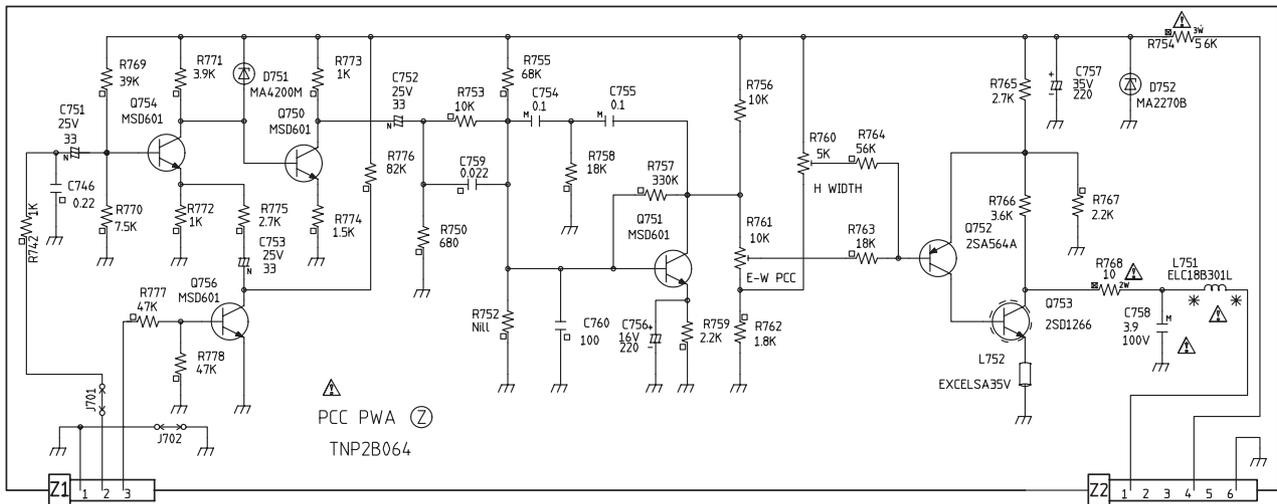
Y-board (CRT) - Schematic Diagram
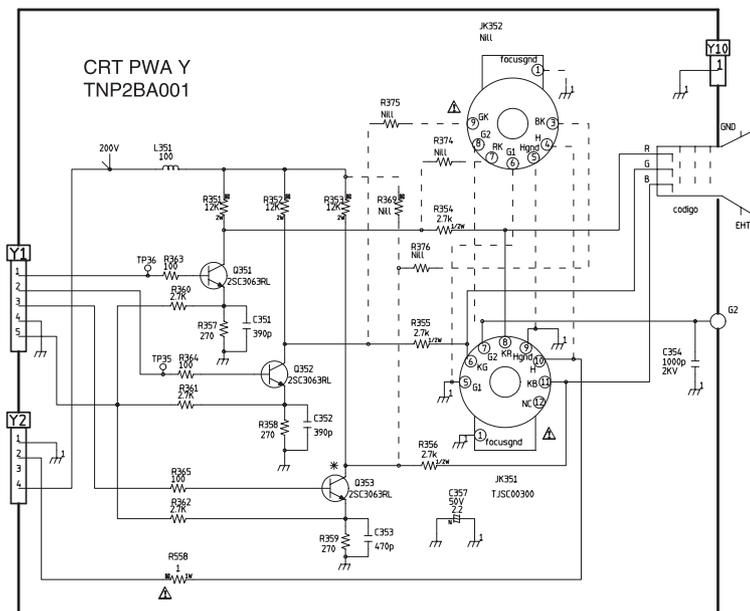
■ Main Board Schematic Diagram - TC-20G12P / TC-29G12P / TC-29G12PU
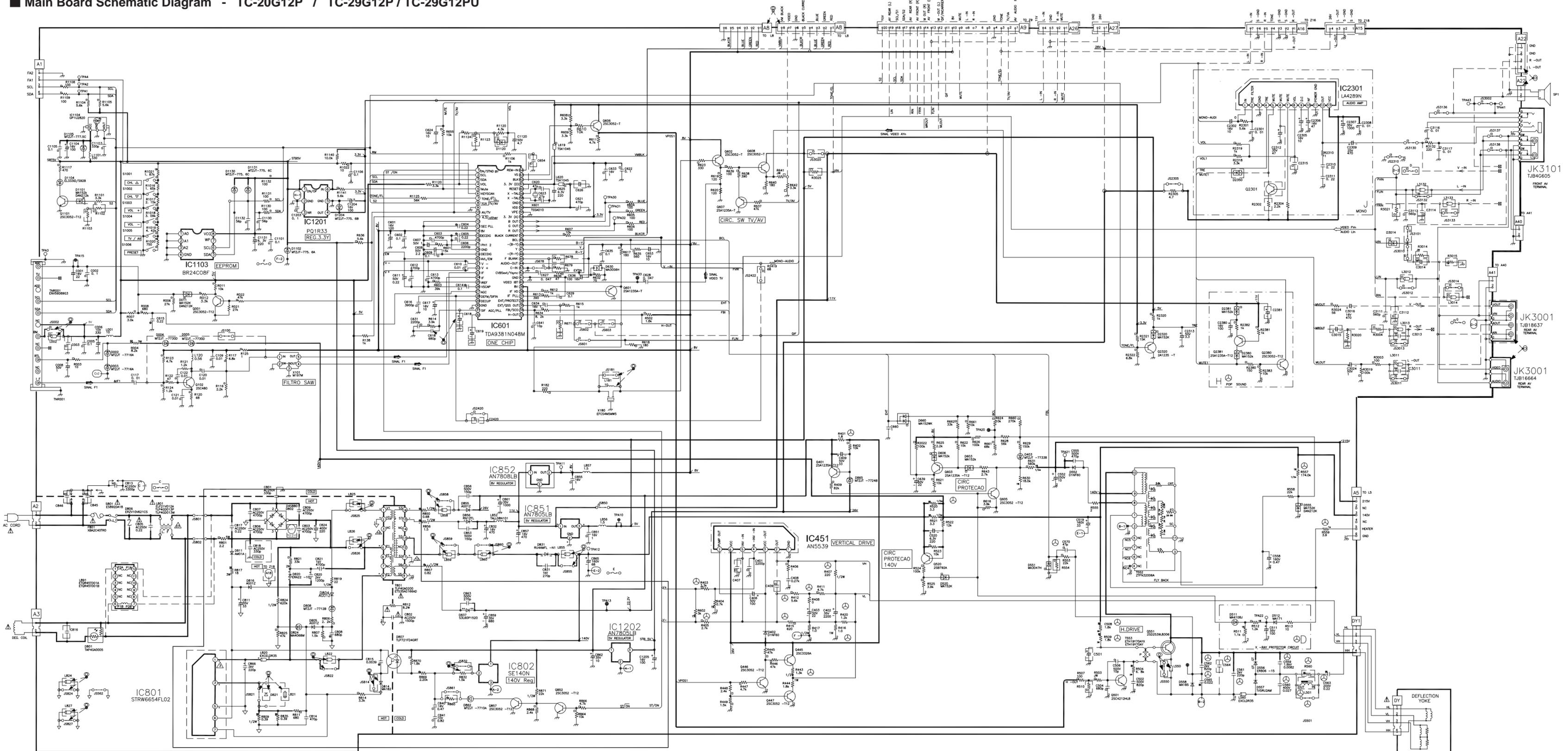
How to obtain the waveform

1. Connect to the antenna input terminal (RF) a COLORBAR signal generator.

2. Adjust the controls of TV set (audio /picture) to normal. Adjust the volume to minimum.

3- Every form of video wave should be visualized in the oscilloscope of wide band and low capacity test points (1 to 10). The form and peak amplitude may vary depending on the oscilloscope and it's adjustment.

IC001

16	**17**	**18**
IC001 - Pin 39	IC001 - Pin 55	IC001 - Pin 62

IC401

12	**13**	**14**	**15**
IC401 - Pin 02	IC401 - Pin 03	IC401 - Pin 04 and 05	IC401 - Pin 07

IC601

01	**02**	**03**	**04**
IC601 - Pin 12	IC601 - Pin 14	IC601 - Pin 15	IC601 - Pin 19
05	**06**	**07**	**08**
IC601 - Pin 20	IC601 - Pin 22	IC601 - Pin 23	IC601 - Pin 24
09	**10**	**11**	
IC601 - Pin 26	IC601 - Pin 32	IC601 - Pins 33,35,45,47 and 64	
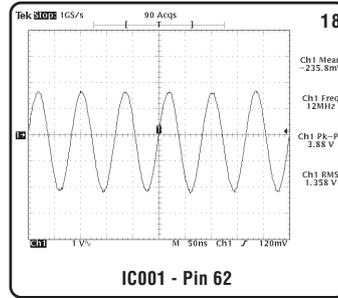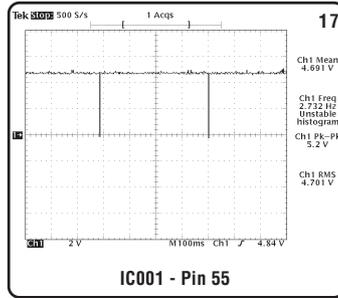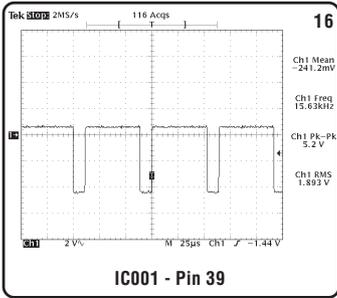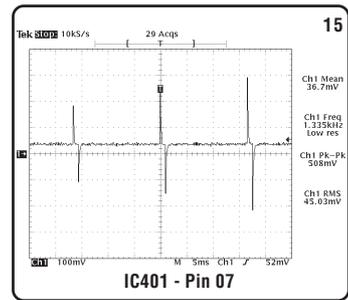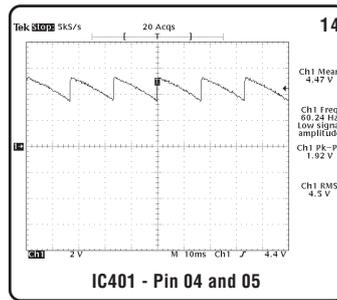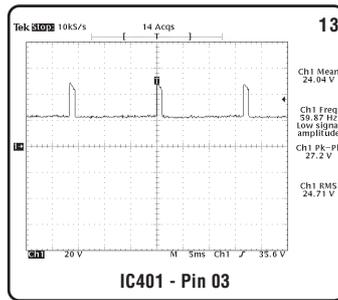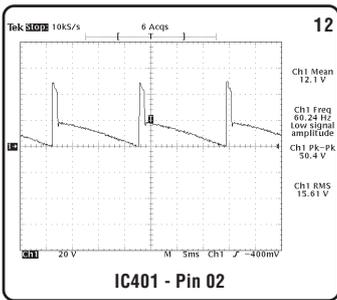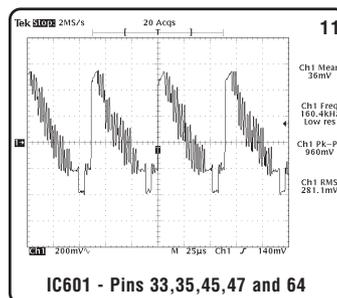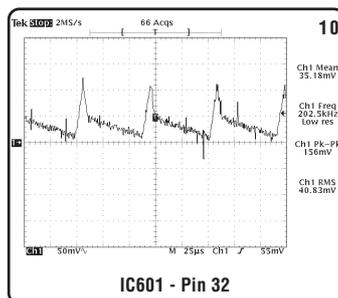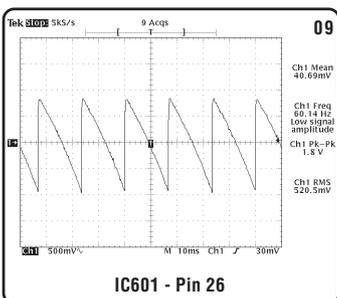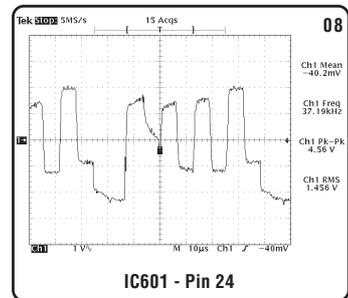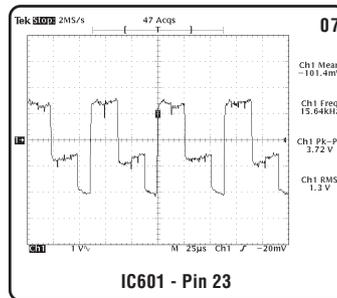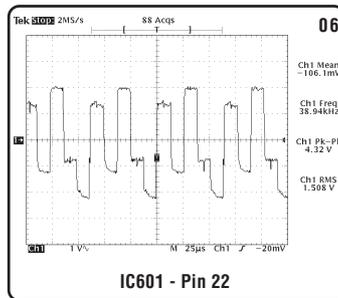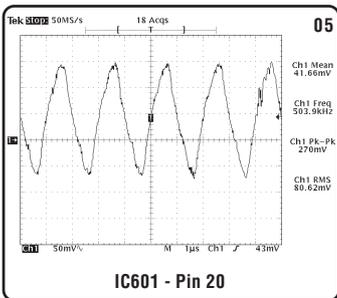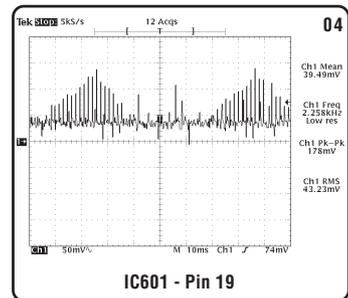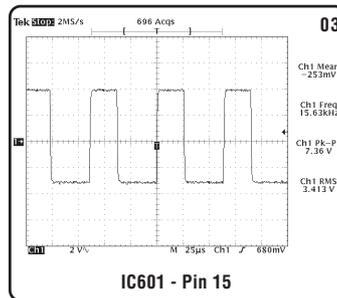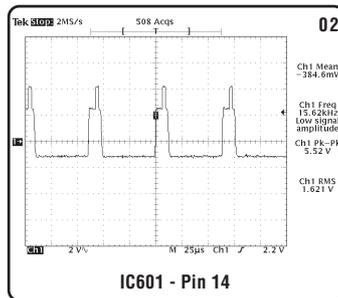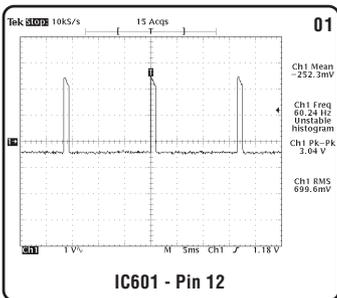
Left signal		Pin	Name		Name	Pin		Right signal
Remote signal in	→	1	RMIN P06	VSS	64	—	GND
AFC <1st tuner)	→	2	ADIN0	OSC2	63	→	12MHz X-tal
Not used/GND	→	3	ADIN1(AFC(2º Tuner)	OSC1	62	←	12MHz X-tal
Lock Detect	←	4	P50	VDD	61	—	+5V
Key in	→	5	ADIN3	P00	60	→	SCL
Action/HHS	→	6	ADIN4	V	59	↔	SDA
VERSION input	→	7	ADIN5	P02	58	←	Version MSB
S-VHS input	→	8	P54	P03	57	←	Version GM
Not used (open)	←	9	P55	P04 / IRQ0	56	→	50/60Hz
FA1	→	10	ADIN8	VSYNC / IRQ1	55	←	V-pulse(neg.)
MTS in	→	11	ADIN9	P07 / RST	54	←	Reset
GND	—	12	CM	P60	53	→	Main AV select 1
Test OSC	—	13	SYNC	P61	52	→	Main AV select 2
Not used (open)	←	14	PWM1(bass)	(mate clock) P62	51	→	X'tal (PAL-M/PAL-N)
Not used (open)	←	15	PWM(treble)	P63	50	→	Sound defeat
Not used (open)	←	16	PWM3(balance)	(PIP AV s1) P64	49	→	Not used (open)
Not used (open)	←	17	PWM4(surround)	(PIP AV s2) P65	48	→	Not used (open)
V-size	←	18	PWM5	P66	47	→	Speaker on(L)off(H)
Not used (open)	←	19	PWM6	VOI	46	→	OSD Semi-trans
Geomagnetic corr.	←	20	PWM7	SPWM	45	→	Volume
Not used (open)	←	21	PWM8	VOW1	44	→	OSD red
+5V	—	22	AVDD	VOW2	43	→	OSD green
(for CC)	←	23	CREF	VOW3	42	→	OSD blue
(for CC)	←	24	VPH	VOB	41	→	OSD blank
(for CC)	←	25	VCP	P16	40	←	Hold down detect
Video signal for CC	→	26	CVBS	HSYNC	39	←	H-plus(neg.)
GND	—	27	AVSS	VSS	38	—	GND
Color Sys 1	←	28	P47	P20	37	→	AI Sound
Color Sys 2	←	29	P46	P21	36	→	IF Defeat
Video Defeat	←	30	P45 (clone det.)	P40	35	→	Recharge
Relay on (H) off (L)	←	31	P44	P41	34	←	Power Down
Mute Defeat	←	32	P43 (clone sw.)	(mate data) P42	33	→	3D WOOFER
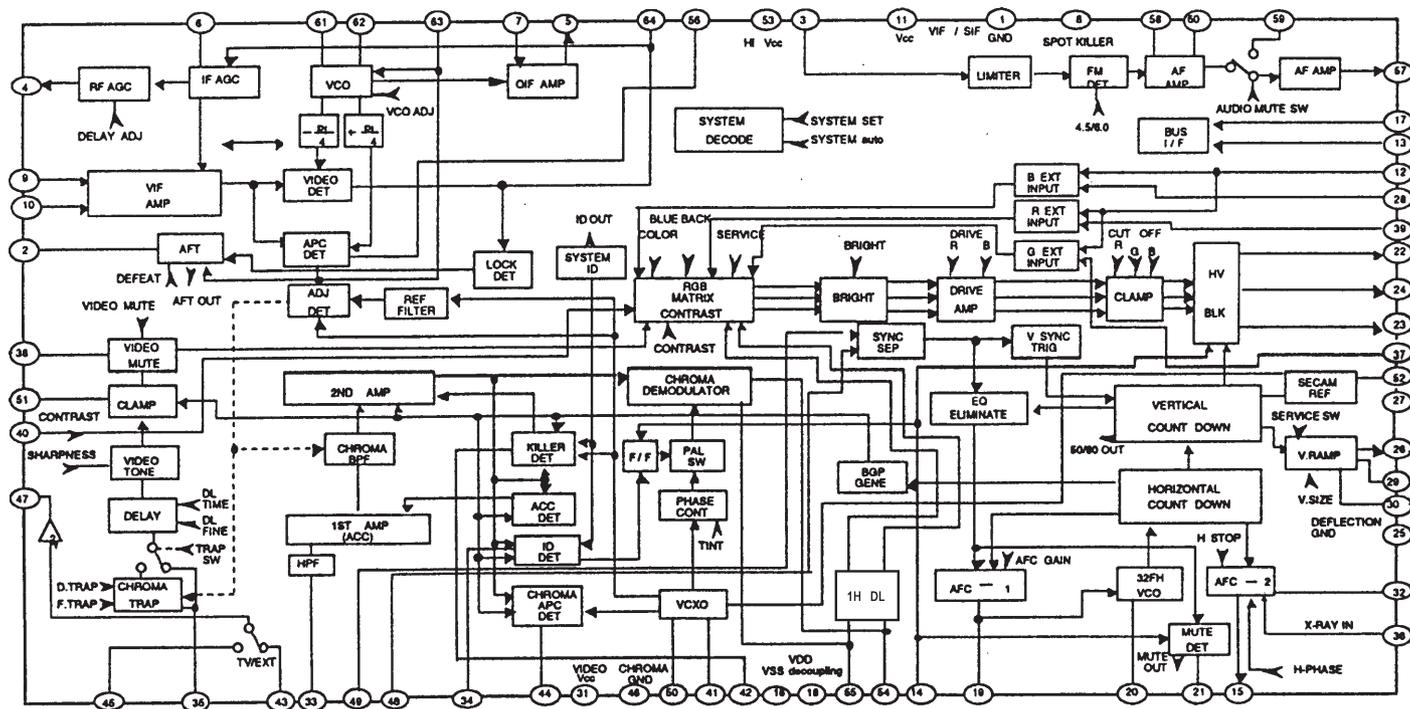
■ IC601 - Pins and Functions

| PINO	NOME	TENSÃO	DESCRIÇÃO	PINO	NOME	TENSÃO	DESCRIÇÃO
01	VIF GND	0V	GND for VIF/SIF Block	31	Video Chroma VCC	5V	5V blocos de vídeo e croma
02	AFT OUT	DC 0.3 - 8,7V	AFT OUT	32	AFC2 FILTER	DC 4.5V	AFC2 FILTER
03	SIF LIMITER IN	DC 0.5 - 4.5V	SIF det. IN	33	CHROMA IN	DC 3.5V	CHROMA input
04	RF AGC OUT	DC 0.3 - 8.7V	RF AGC OUT	34	ID FILTER		Identification filter
05	QIF OUT	DC 3.2V	QIF det. OUT	35	VIDEO IN	DC 2.7V	Video input
06	IF AGC filter	DC 1.8 - 4.6V	IF AGC filter pin	36	X-RAY IN	DC 0V	X-RAY in
07	QIF IN	DC 1.8 - 4.6V	QIF sound carrier input pin	38	BLACK HOLD	DC 3.1V	Black level hold pin for black strech function
08	Spot Killer	DC 7.5V	Spot killer capacitor pin	40	CONTRAST		Detection ACL filter
09	VIF IN (1)	DC 1.5V	VIF det. input pin	41	X-TAL 3.58	DC 3.3V	Crystal NTSC
10	VIF IN (2)	DC 1.5V	VIF det. input pin	42	KILLER FILTER	DC 3.7V	Killer filter
11	VIF Vcc (5V)	DC 5.0V	5V to VIF/SIF Block	43	EXT IN	DC 1.95V	External video input
12	FAST BLK	DC 0.0V	TV/Half Tone/EXT RGB SW control	44	CHROMA APC	DC 3.0V typ	CHROMA APC FILTER
13	SCL		SCL pin for IIC BUS	45	TV IN	DC 1.95V	Video input
14	SCP		Sand castle pulse output pin	46	VIDEO/CHROMA GND	0V	GND for Video and Chroma blocks
15	HOUT		H pin pre-drive output	47	Y SW OUT		Video tuner output TV/EXT
16	VSS	0V	Ground pin of CMOS	48	H-SYNC SEP IN		H-SYNC SEP IN
17	SDA		SDA pin of IIC BUS	49	V-SYNC SEP IN		V-SYNC SEP IN
18	VDD	DC 5.0V	VDD decoupling pin	50	X-TAL PAL	DC 3.3V	Crystal PAL
19	AFC1 FILTER		AFC-1 filter pin of 32fH VCO	51	VIDEO CLAMP	DC 3V	Video Clamp
20	H OSC	DC 2.45V	Pino H OSC	52	SECAM REF		SECAM REF
21	MUTE FILTER	DC 0.3 - 8.7V	Mute Filter	53	Hi Vcc (9V)	9.0V	9V for output (RGB, AF, AFT/RF AGC)
22	R OUT		"R" output	54	-(B-Y) IN	DC 2.9V	SECAM signal input
23	G OUT		"G" output	55	-(R-Y) IN	DC 2.9V	SECAM signal input
24	B OUT		"B" output	56	VIF APC FILTER2	DC 3.0V	VIF APC filter
25	DEFLECTION GND	0V	Deflection GND	57	OUDIO OUT	DC 2.8V	Audio output
26	V OUT		Vertical output	58	AUDIO BYPASS	DC 2.3 ~ 3.0V	Audio Bypass
29	V RAMP feedback		V RAMP feedback	59	EXT AUDIO IN	DC 2.5V	External Audio input
30	V RAMP C		V RAMP capacitor	60	FM DIRECT OUT	DC 2.5V	Audio output
27	START UP	9V (VCC)	Deflection 9V, IIC BUS and VDD control	61	VIF VCO(1)	DC 4.2V	Coil VIF VCO
28	B IN	DC 2.5V		62	VIF VCO(2)	DC 4.2V	Coil VIF VCO
37	G IN	DC 2.5V		63	VIF APC FILTER1	DC 3.0V	VIF APC filter
39	R IN	DC 2.5V		64	VIF VIDEO OUT	2.2Vp-p	Video Detector output
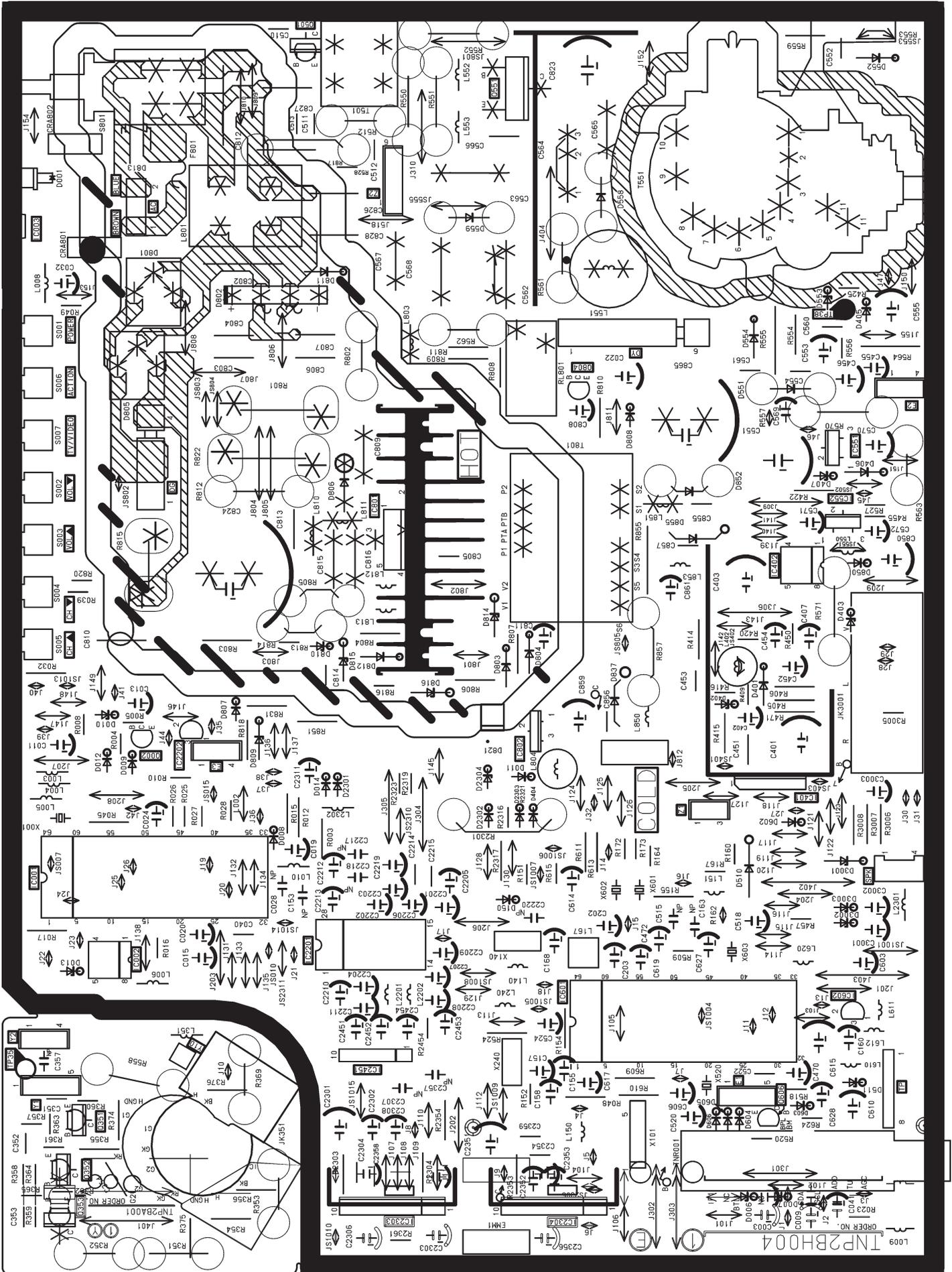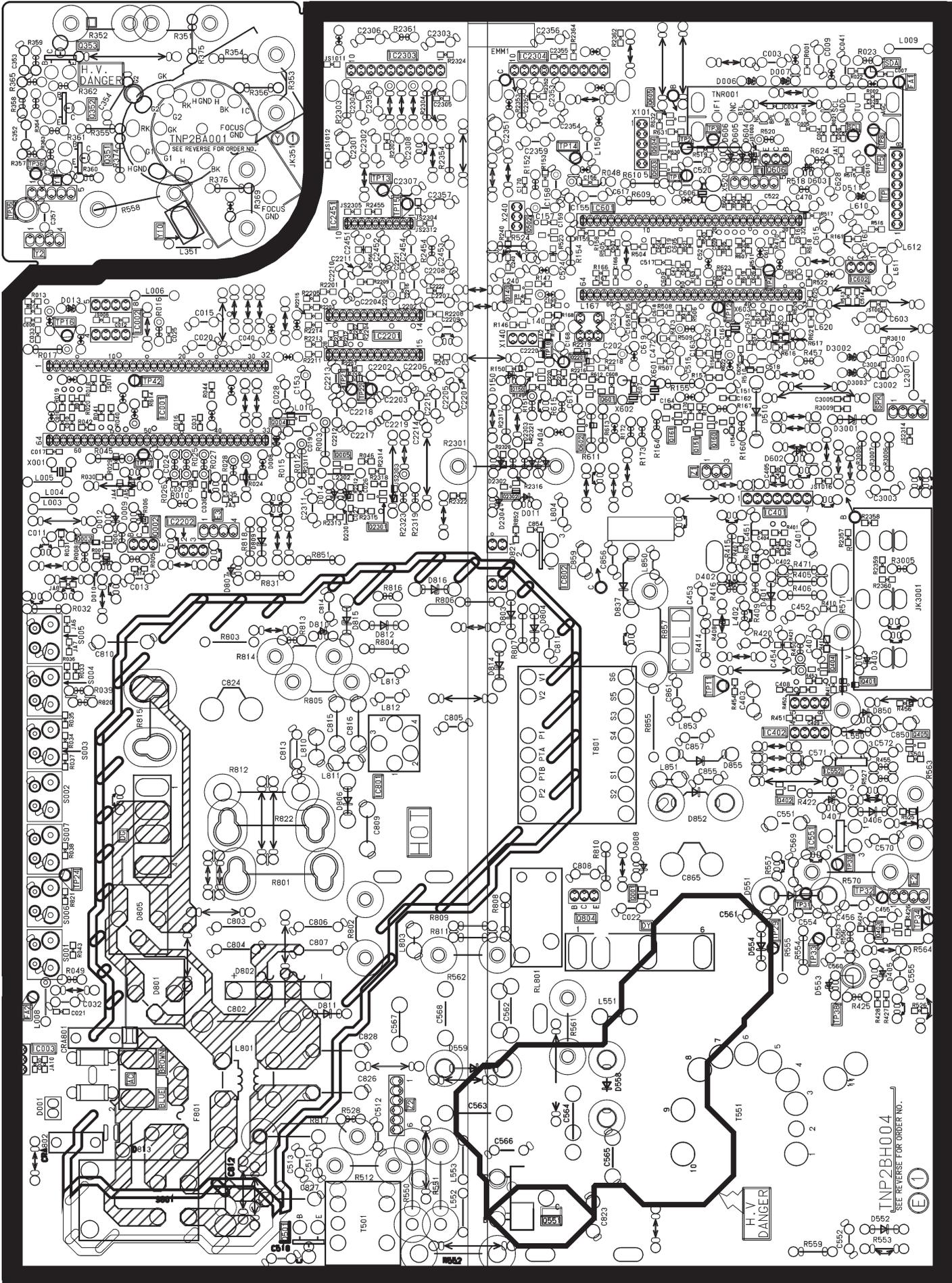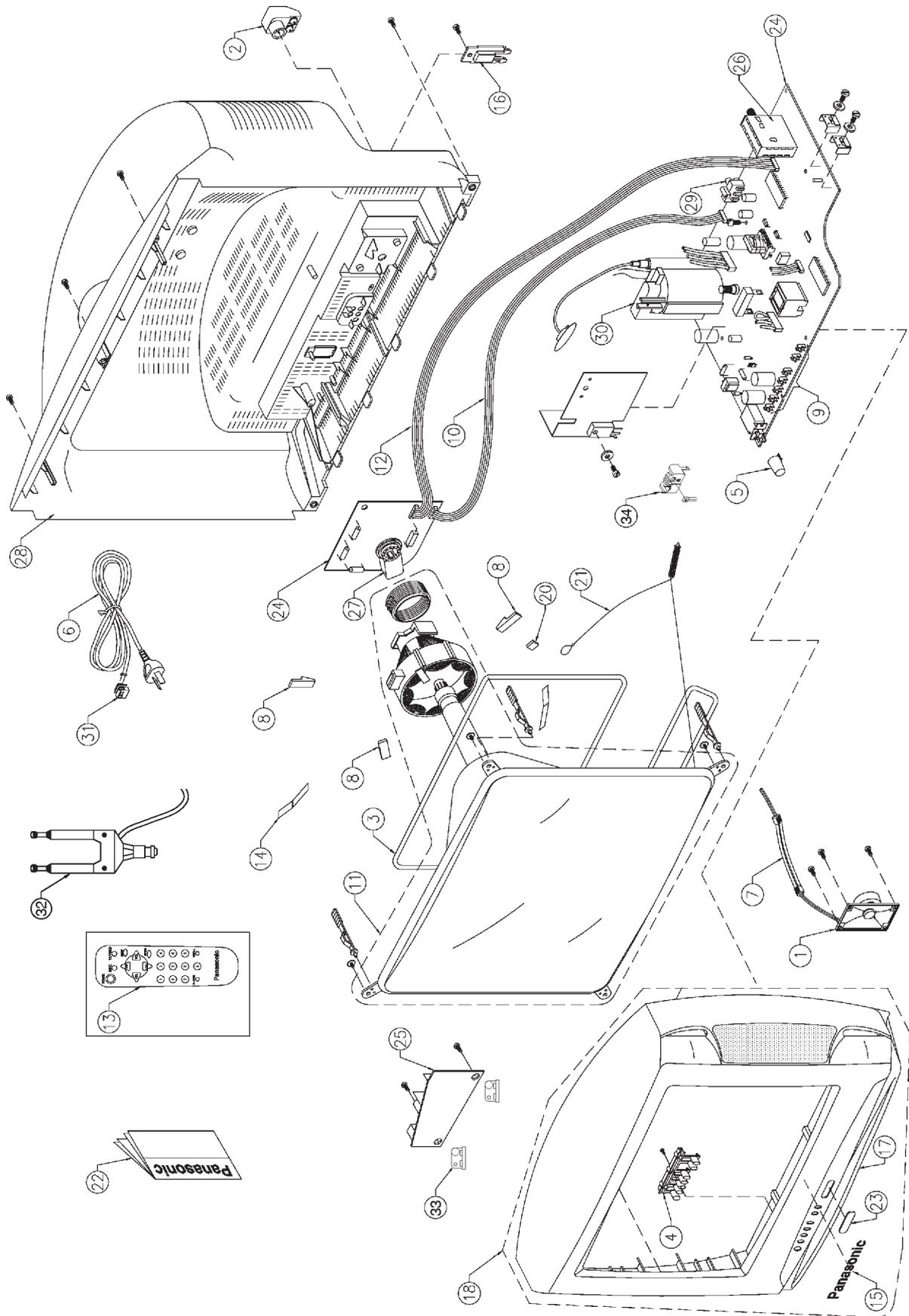
Ref. No.	TC-20G12P	TC-29G12P	TC-29G12PU	DESCRIPTION
01	EAS-12D168ZC	EAS-15S101ZB	EAS-15S101ZB	SPEAKER
02	S-U5012	S-U5012	S-U5012	75 Ω ADAPTOR
03	TLK2B20001A	TLK2B29001A	TLK2B29001A	DEGAUSSING COIL
04	TBX2B855	TBX2B858	TBX2B858	7 POSITION BUTTON
05	TBX2B856	TBX2B857	TBX2B857	POWER BUTTON
06	TSX2B1421SB	TSX2B1421SB	TSX2BA03	AC CABLE
07	TXAJTSPCB20G9	TXAJTSPCB29A9	TXAJTSPCB29A9	SPEAKER CABLE
08	—o—	TPD2B737	TPD2B737	DY WEDGE
09	BVQPB001T	BVQPB001T	BVQPB001T	SWITCH (S001/S006)
10	TXAJTE32CB20A9	TXAJTE2CB29A9-1	TXAJTE2CB29A9-1	Y2 E2 CABLE CONNECTION (4 WAYS)
11	A48EAK01X092R	A68QBT892X10	A68QBT892X10	CRT
12	TXAJTE2CB29A9-1	TXAJTE32CB20A9	TXAJTE32CB20A9	Y1 E1 CABLE CONNECTION (5 WAYS)
13	TNQ2B2005	TNQ2B2005	TNQ2B2005	REMOTE CONTROL UNIT
14	—o—	TMK2B903	TMK2B903	MAGNET
15	TBM4G3003	TBM4G3003	TBM4G3003	PANASONIC BADGE
16	TKP2B11161-1	TKP2B11161-1	TKP2B11161-1	AC CABLE HOLDER
17	TKY2B0906-4	TKY2B1304-3	TKY2B1304-3	CABINET
19	TKK2B0304	TKK2B0303	TKK2B0303	LED GUIDE
20	—o—	EXCELSA35T	EXCELSA35T	MAGNET
26	ENV56D75G3R	ENV56D75G3R	ENV56D75G3R	TUNER
21	TXF3A20C7-1	TXF3A20C7-1	TXF3A20C7-1	COIL SPRING
22	TQB2B0129-1	TQB2B0129-1	TQB2B0129-1	OPERATING INSTRUCTIONS
23	TKP2B11201-2	TKP2B11191-2	TKP2B11191-2	PAINEL FUME
24	TZGNPAC20G12P	TZGNPAC29G12P	TZGNPAC29G12P	A/C BOARD
25	—o—	TZGNPZ29G12	TZGNPZ29G12	Z BOARD
27	TJSC00300	TJSC00300	TJSC00300	JACK JK351
28	TKU2B21604-4	TKU2B22005-3	TKU2B22005-3	REAR COVER
29	TJB2A9063B	TJB2A9063B	TJB2A9063B	JACK JK3001
30	KFT3AB119F1	KFT4AB143F	KFT4AB143F	FLY-BACK
31	TMM2B202-1	TMM2B202-1	TMM2B202-1	AC CABLE COVER
32	TSA8108-6KP	—o—	—o—	TELESCOPIC ANTENNA
33	—o—	TKX2B0301	TKX2B0301	SUPORT (Z-PCB)
34	TMW2B204	TMW2B204	TMW2B204	BRACKET (REMOTE CONTROL RECEPTOR)

(✱) Please refer to the **Especial Replacement Parts Table** on page 40.

ASSEMBLED BOARDS

REF. NO.	PART NO.	DESCRIPTION
	TZGNPAC29G12P	A/C BOARD
	TZGNPZ29G12	Z BOARD

CAPACITORS

REF. NO.	PART NO.	DESCRIPTION
C003	ECA1HM4R7B	CAP. ELETROL. 4,70 µF 50 V
C004	ECJ2VC1H330J	CAP. CER. SMD 33 PF 50 V
C005	ECJ2VC1H330J	CAP. CER. SMD 33 PF 50 V
C008	ECJ2VF1H104Z	CAP. CER. SMD 100 nF 50 V
C009	ECA1HM100B	CAP. ELETROL. 10 µF 50 V
C010	ECJ2VF1H103Z	CAP. CER. SMD 10 nF 50 V
C011	ECA1CM221B	CAP. ELETROL. 220 µF 16 V
C012	ECJ2VF1H104Z	CAP. CER. SMD 100 nF 50 V
C013	ECA0JM101B	CAP. ELETROL. 100 µF 6,3 V
C015	ECA1HM010B	CAP. ELETROL. 1 µF 50 V
C016	ECJ2VC1H101J	CAP. CER. SMD 100 PF 50 V
C017	ECJ2VC1H220J	CAP. CER. SMD 22 PF 50 V
C018	ECJ2VC1H220J	CAP. CER. SMD 22 PF 50 V
C019	ECA0JM101B	CAP. ELETROL. 100 µF 6,3 V
C020	ECA0JM101B	CAP. ELETROL. 100 µF 6,3 V
C022	ECA1CM471B	CAP. ELETROL. 470 µF 16 V
C024	ECA1EM4R7B	CAP. ELETROL. 4,70 µF 25 V
C025	ECJ2VC1H101J	CAP. CER. SMD 100 PF 50 V
C026	ECJ2VC1H681J	CAP. CER. SMD 680 PF 50 V
C027	ECJ2VC1H101J	CAP. CER. SMD 100 PF 50 V
C028	ECEA1HNR47UB	CAP. ELETROL. BIP. 0,47 µF 50 V
C031	ECJ2VB1H821K	CAP. CER. SMD 820 PF 50 V
C032	ECA1CM470B	CAP. ELETROL. 47 µF 16 V
C034	ECJ2VF1H103Z	CAP. CER. SMD 10 nF 50 V
C035	ECJ2VC1H220J	CAP. CER. SMD 22 PF 50 V
C036	ECJ2VC1H220J	CAP. CER. SMD 22 PF 50 V
C037	ECJ2VC1H220J	CAP. CER. SMD 22 PF 50 V
C038	ECJ2VC1H220J	CAP. CER. SMD 22 PF 50 V
C041	ECA1EM100B	CAP. ELETROL. 10 µF 25 V
C153	ECEA1HN010UB	CAP. ELETROL. BIP. 1 µF 50 V
C154	ECJ2VC1H390J	CAP. CER. SMD 39 PF 50 V
C155	ECA1CM470B	CAP. ELETROL. 47 µF 16 V
C156	ECJ2VF1H103Z	CAP. CER. SMD 10 nF 50 V
C157	ECA1HMR22B	CAP. ELETROL. 0,22 µF 50 V
C158	ECA1HMR22B	CAP. ELETROL. 0,22 µF 50 V
C159	ECJ2VF1H103Z	CAP. CER. SMD 10 nF 50 V
C160	ECA1HM100B	CAP. ELETROL. 10 µF 50 V
C161	ERJ6GEY0R00V	RES. MET. FILM SMD 0 Ω 1/10 W
C162	ECJ2VC1H330J	CAP. CER. SMD 33 PF 50 V
C163	ECEA1CN100UB	CAP. ELETROL. BIP. 10 µF 16 V
C165	ECJ2VC1H101J	CAP. CER. SMD 100 PF 50 V
C168	ECA1HMR33B	CAP. ELETROL. 0,33 µF 50 V
C169	ECJ2VC1H221J	CAP. CER. SMD 220 PF 50 V
C170	ECJ2VF1H103Z	CAP. CER. SMD 10 nF 50 V
C202	ECA1HM100B	CAP. ELETROL. 10 µF 50 V
C203	ECA1HM100B	CAP. ELETROL. 10 µF 50 V
C240	ECJ2VC1H121J	CAP. CER. SMD 120 PF 50 V
C351	ECKR1H391KB5	CAP. CER. 390 PF 50 V
C352	ECKR1H391KB6	CAP. CER. 390 PF 50 V
C353	ECKR1H471KB5	CAP. CER. 470 PF 50 V
C354	ECKW3D102KBN	CAP. CER. 1 nF 2.000 V
C357	ECEA1HN2R2UB	CAP. ELETROL. BIP. 2,20 µF 50 V
C401	ECA1VHG102B	CAP. ELETROL. 1.000 µF 35 V
C402	ECA1HHG010B	CAP. ELETROL. 1 µF 50 V
C403	ECA1VM102E	CAP. ELETROL. 1.000 µF 35 V
C405	ECJ2VB1H102K	CAP. CER. SMD 1 nF 50 V
C406	ECJ2VB1H102K	CAP. CER. SMD 1 nF 50 V
C407	ECA1HHGR22B	CAP. ELETROL. 0,22 µF 50 V
C408	ECJ2VC1H102J	CAP. CER. SMD 1 nF 50 V
C409	ECJ2VF1H103Z	CAP. CER. SMD 10 nF 50 V
C451	ECQE1224KF3	CAP. POLIÉSTER 220 nF 100 V
C452	EEUFC1V820B	CAP. ELETROL. 82 µF 35 V
C453	ECQB1H104JM6	CAP. POLIÉSTER 100 nF 50 V
C454	ECA1HHG330B	CAP. ELETROL. 33 µF 50 V
C455	ECA1JHG100B	CAP. ELETROL. 10 µF 63 V

CAPACITORS

REF. NO.	PART NO.	DESCRIPTION
C456	EEUFC1J470B	CAP. ELETROL. 47 µF 63 V
C470	ECSF1EE105VB	CAP. TÂNTALO 1 µF 25 V
C471	ECJ2VB1H103K	CAP. CER. SMD 10 nF 50 V
C472	ECA1HM010B	CAP. ELETROL. 1 µF 50 V
C509	ECJ2VB1E104K	CAP. CER. SMD 100 nF 25 V
C510	ECCR2H100D5	CAP. CER. 10 PF 100 V
C511	ECKR2H821KB5	CAP. CER. 820 PF 500 V
C512	ECKR2H101KB5	CAP. CER. 100 PF 500 V
C514	(✱)	
C515	ECEA1HN010UB	CAP. ELETROL. BIP. 1 µF 50 V
C516	ECJ2VB1H122K	CAP. CER. SMD 1,20 nF 50 V
C517	ECJ2VF1H103Z	CAP. CER. SMD 10 nF 50 V
C518	(✱)	
C520	ECA1HM010B	CAP. ELETROL. 1 µF 50 V
C521	ECJ2VB1H822K	CAP. CER. SMD 8,20 nF 50 V
C522	ECQB1H822JM3	CAP. POLIÉSTER 8,20 nF 50 V
C524	ECA1CM101B	CAP. ELETROL. 100 µF 16 V
C551	ECA1VM222B	CAP. ELETROL. 2.200 µF 35 V
C552	(✱)	
C553	ECA1CM471B	CAP. ELETROL. 470 µF 16 V
C554	ECKR2H561KB5	CAP. CER. 560 PF 500 V
C555	ECA2EM220B	CAP. ELETROL. 22 µF 250 V
C560	ECQB1104JM3	CAP. POLIÉSTER 100 nF 100 V
C561	ECKR2H561KB6	CAP. CER. 560 PF 500 V
C562	(✱)	
C563	(✱)	
C564	(✱)	
C565	(✱)	
C566	ECKW3D181JBP	CAP. CER. 180 PF 2.000 V
C567	(✱)	
C569	ECA1HHG220B	CAP. ELETROL. 22 µF 50 V
C571	ECA1CM101B	CAP. ELETROL. 100 µF 16 V
C572	ECA1EM100B	CAP. ELETROL. 10 µF 25 V
C603	ECA1CM470B	CAP. ELETROL. 47 µF 16 V
C604	ECJ2VC1H680J	CAP. CER. SMD 68 PF 50 V
C605	ECJ2VF1H103Z	CAP. CER. SMD 10 nF 50 V
C606	ECA1CM470B	CAP. ELETROL. 47 µF 16 V
C607	ECJ2VC1H270J	CAP. CER. SMD 27 PF 50 V
C608	ECJ2VC1H270J	CAP. CER. SMD 27 PF 50 V
C610	ECA1AHG471B	CAP. ELETROL. 470 µF 10 V
C611	ECJ2VF1E104Z	CAP. CER. SMD 100 nF 25 V
C612	ECJ2VF1E104Z	CAP. CER. SMD 100 nF 25 V
C613	ECJ2VF1E104Z	CAP. CER. SMD 100 nF 25 V
C614	ECA1EM4R7B	CAP. ELETROL. 4,70 µF 25 V
C615	ECA0JM222B	CAP. ELETROL. 2.200 µF 6,3 V
C616	ECJ2VF1H223Z	CAP. CER. SMD 22 nF 50 V
C617	ECA1HMR22B	CAP. ELETROL. 0,22 µF 50 V
C618	ECJ2VF1H103Z	CAP. CER. SMD 10 nF 50 V
C619	ECA1CM221B	CAP. ELETROL. 220 µF 16 V
C620	ECJ2VB1H223K	CAP. CER. SMD 22 nF 50 V
C621	ECJ2VB1H223K	CAP. CER. SMD 22 nF 50 V
C622	ECJ2VB1C224K	CAP. CER. SMD 220 nF 16 V
C623	ECJ2VC1H121J	CAP. CER. SMD 120 PF 50 V
C624	ECJ2VB1H153K	CAP. CER. SMD 15 nF 50 V
C625	ECJ2VC1H220J	CAP. CER. SMD 22 PF 50 V
C626	ECJ2VB1E104K	CAP. CER. SMD 100 nF 25 V
C627	ECA1HMR47B	CAP. ELETROL. 0,47 µF 50 V
C746	(✱)	
C751	(✱)	
C752	(✱)	
C753	(✱)	
C754	(✱)	
C755	(✱)	
C756	(✱)	
C757	(✱)	
C758	(✱)	
C759	(✱)	
C760	(✱)	
C803	ECKWAE472ZED	CAP. CER. 4,70 nF 250 V

(✻) Please refer to the **Especial Replacement Parts Table** on page 40.

CAPACITORS

REF. NO.	PART NO.	DESCRIPTION
C804	ECKWAE472ZED	CAP. CER. 4,70 nF 250 V
C805	ECKR1H471KB6	CAP. CER. 470 PF 50 V
C806	ECKWAE472ZED	CAP. CER. 4,70 nF 250 V
C807	ECKWAE472ZED	CAP. CER. 4,70 nF 250 V
C810	ECKCNA152MEB	CAP. CER. 1,50 nF 4.000 V
C811	ECA1EM101B	CAP. ELETROL. 100 µF 25 V
C812	ECQU2A224MNB	CAP. POLIPROP. 220 nF 100 V
C814	ECKR2H561KB7	CAP. CER. 560 PF 500 V
C816	ECKW3D331JBP	CAP. CER. 330 PF 2.000 V
C823	ECEA160V33ZE	CAP. ELETROL. 33 µF 160 V
C824	(✻)	
C854	ECJ2VB1E104K	CAP. CER. SMD 100 nF 25 V
C855	ECKW3A821KBP	CAP. CER. 820 PF 1.000 V
C856	ECKR2H561KB8	CAP. CER. 560 PF 500 V
C857	ECKR2H471KB5	CAP. CER. 470 PF 500 V
C859	ECA1EM102GB	CAP. ELETROL. 1.000 µF 25 V
C861	ECA1EM101B	CAP. ELETROL. 100 µF 25 V
C865	EC0S2DG151DG	CAP. ELETROL. 150 µF 200 V
C2201	ECSF16E3R3VB	CAP. TÂNTALO 3,30 µF 16 V
C2202	ECA1EM4R7B	CAP. ELETROL. 4,70 µF 25 V
C2203	ECA1HM010B	CAP. ELETROL. 1 µF 50 V
C2204	ECA1EM4R7B	CAP. ELETROL. 4,70 µF 25 V
C2205	ECA1EM4R7B	CAP. ELETROL. 4,70 µF 25 V
C2206	ECA1EM4R7B	CAP. ELETROL. 4,70 µF 25 V
C2207	ECA1EM4R7B	CAP. ELETROL. 4,70 µF 25 V
C2208	ECA1EM4R7B	CAP. ELETROL. 4,70 µF 25 V
C2209	ECA1AM101B	CAP. ELETROL. 100 µF 10 V
C2210	ECA1HMR33B	CAP. ELETROL. 0,33 µF 50 V
C2211	ECEA1HUR68B	CAP. ELETROL. 0,68 µF 50 V
C2212	ECA1HM2R2B	CAP. ELETROL. 2,20 µF 50 V
C2213	ECA1EM100B	CAP. ELETROL. 10 µF 25 V
C2214	ECQB1H104JM3	CAP. POLIÉSTER 100 nF 50 V
C2215	ECQB1H223JM3	CAP. POLIÉSTER 22 nF 50 V
C2216	ECJ2VB1H332K	CAP. CER. SMD 3,30 nF 50 V
C2217	ECEA1HN010UB	CAP. ELETROL. BIP. 1 µF 50 V
C2218	ECEA1HN010UB	CAP. ELETROL. BIP. 1 µF 50 V
C2219	ECSF16E10VB	CAP. TÂNTALO 10 µF 16 V
C2220	ECEA1CN100UB	CAP. ELETROL. BIP. 10 µF 16 V
C2221	ECJ2VB1H103K	CAP. CER. SMD 10 nF 50 V
C2222	ECJ2VB1H472K	CAP. CER. SMD 4.700 PF 50 V
C2302	ECA1HM3R3B	CAP. ELETROL. 3,30 µF 50 V
C2303	ECA1HM100B	CAP. ELETROL. 10 µF 50 V
C2304	ECQB1H104JM4	CAP. POLIÉSTER 100 nF 50 V
C2305	ECJ2VB1H332K	CAP. CER. SMD 3,30 nF 50 V
C2306	ECA1CM221B	CAP. ELETROL. 220 µF 16 V
C2307	ECEA1HN010UB	CAP. ELETROL. BIP. 1 µF 50 V
C2308	ECA1HHG010B	CAP. ELETROL. 1 µF 50 V
C2311	ECA1HM3R3B	CAP. ELETROL. 3,30 µF 50 V
C2351	ECA1EM102GB	CAP. ELETROL. 1.000 µF 25 V
C2352	ECA1HHG3R3B	CAP. ELETROL. 3,30 µF 50 V
C2353	ECA1HHG100B	CAP. ELETROL. 10 µF 50 V
C2354	ECQB1H104JM5	CAP. POLIÉSTER 100 nF 50 V
C2355	ECJ2VB1H332K	CAP. CER. SMD 3,30 nF 50 V
C2356	ECA1CHG221B	CAP. ELETROL. 220 µF 16 V
C2357	ECEA1HN010UB	CAP. ELETROL. BIP. 1 µF 50 V
C2451	ECA1EM100B	CAP. ELETROL. 10 µF 25 V
C2452	ECA1EM100B	CAP. ELETROL. 10 µF 25 V
C2453	ECA1EM4R7B	CAP. ELETROL. 4,70 µF 25 V
C2454	ECA1CM221B	CAP. ELETROL. 220 µF 16 V
C3001	ECA1HM010B	CAP. ELETROL. 1 µF 50 V
C3002	ECA1HM010B	CAP. ELETROL. 1 µF 50 V
C3003	ECA1HM010B	CAP. ELETROL. 1 µF 50 V
C3004	ECJ2VB1H272K	CAP. CER. SMD 2,70 nF 50 V
C3005	ECJ2VB1H272K	CAP. CER. SMD 2,70 nF 50 V

DIODES

D001	EL333ID-F45R	LED DIODE
D006	MA4330HTA	ZENER DIODE 34 V 0,37 W
D008	MA165TA5VT	SWITCHING DIODE

DIODES

REF. NO.	PART NO.	DESCRIPTION
D010	MA4047HTA	ZENER DIODE 4,7 V 0,37 W
D012	MA165TA5VT	SWITCHING DIODE
D013	MA4068MTA	ZENER DIODE 6,8 V 1/4 W
D014	MA165TA5VT	SWITCHING DIODE
D2301	MA165TA5VT	SWITCHING DIODE
D2302	MA165TA5VT	SWITCHING DIODE
D2304	MA4068MTA	ZENER DIODE 6,8 V 1/4 W
D3001	MA4110MTA	ZENER DIODE 11 V 0,37 W
D3002	MA4110MTA	ZENER DIODE 11 V 0,37 W
D3003	MA4110MTA	ZENER DIODE 11 V 0,37 W
D401	ERA1501V3	SWITCHING DIODE
D402	MA4360MTA	ZENER DIODE 36 V 0,37 W
D403	MTZJT-774.7C	ZENER DIODE 4,7 V 0,5 W
D404	MA165TA5VT	SWITCHING DIODE
D405	MTZJT-7736D	ZENER DIODE 36 V 0,5 W
D406	MA165TA5VT	SWITCHING DIODE
D407	MA4051HTA	ZENER DIODE 5,3 V 0,37 W
D510	EU2V1	RECTIFY DIODE
D511	MTZJT-775.6A	ZENER DIODE 5,4 V 1/2 W
D551	RU2NV1	DIODE
D552	AU02V0	POWER DIODE
D554	AU02V1	POWER DIODE
D558	(✻)	
D559	(✻)	
D602	MA165TA5VT	SWITCHING DIODE
D751	(✻)	
D752	(✻)	
D801	(✻)	
D802	D4SB80	RECTIFY DIODE
D803	EU02V1	RECTIFY DIODE
D804	EU02V2	RECTIFY DIODE
D805	(✻)	
D808	MA165TA5VT	SWITCHING DIODE
D810	MTZJT-776.8C	ZENER DIODE 6,8 V 0,5 W
D811	AM01AV0	RECTIFY DIODE
D812	EU02V3	RECTIFY DIODE
D814	MA2240-BLFS	ZENER DIODE 24 V 1 W
D821	PC123F2	FOTO ACOPLADOR
D837	RU3YX-MV1	RECTIFY DIODE
D852	RL30A	RECTIFY DIODE
D855	EU2V2	RECTIFY DIODE

FUSE

F801	XBA2C40TR0	FUSE 4A 250V

INTEGRATED CIRCUITS

IC001	MN1874083TK2	IC MICROPROCESSOR
IC002	S-24C08ADP	IC EEPROM (8K)
IC003	RPM6937-V13	IC MONOLITIC
IC2201	AN5819K	IC
IC2202	AN78L09TA	IC MONOLITIC
IC2303	LA4285	IC MONOLITIC
IC2451	AN5285K	IC SOUND AGC
IC401	LA7840	IC VERTICAL-OUT
IC402	BA225	IC
IC551	AN78M09LB	IC REGULATOR
IC552	AN78M05LB	IC REGULATOR
IC601	M52770ASP700	IC MONOLITIC
IC602	AN78L09TA	IC MONOLITIC
IC801	(✻)	
IC802	SE130NLF4	IC VOLTAGE REGULATOR

JUMPERS

J703	ERJ6GEY0R00V	RES. MET. FILM SMD 0 Ω 1/10 W
JA1	ERJ6GEY0R00V	RES. MET. FILM SMD 0 Ω 1/10 W
JA10	ERJ6GEY0R00V	RES. MET. FILM SMD 0 Ω 1/10 W
JA2	ERJ6GEY0R00V	RES. MET. FILM SMD 0 Ω 1/10 W
JA3	ERJ6GEY0R00V	RES. MET. FILM SMD 0 Ω 1/10 W
JA4	ERJ6GEY0R00V	RES. MET. FILM SMD 0 Ω 1/10 W

■ Replacement Parts List

(✳) Please refer to the **Especial Replacement Parts Table** on page 40.

JUMPERS

REF. NO.	PART NO.	DESCRIPTION
JA5	ERJ6GEY0R00V	RES. MET. FILM SMD 0 Ω 1/10 W
JA6	ERJ6GEY0R00V	RES. MET. FILM SMD 0 Ω 1/10 W
JA7	ERJ6GEY0R00V	RES. MET. FILM SMD 0 Ω 1/10 W
JA8	ERJ6GEY0R00V	RES. MET. FILM SMD 0 Ω 1/10 W
JS006	ERJ6GEY0R00V	RES. MET. FILM SMD 0 Ω 1/10 W
JS011	ERJ6GEY0R00V	RES. MET. FILM SMD 0 Ω 1/10 W
JS1002	ERJ6GEY0R00V	RES. MET. FILM SMD 0 Ω 1/10 W
JS1003	ERJ6GEY0R00V	RES. MET. FILM SMD 0 Ω 1/10 W
JS1016	ERJ6GEY0R00V	RES. MET. FILM SMD 0 Ω 1/10 W
JS2303	ERJ6GEY0R00V	RES. MET. FILM SMD 0 Ω 1/10 W
JS2312	ERJ6GEY0R00V	RES. MET. FILM SMD 0 Ω 1/10 W
JS2314	ERJ6GEY0R00V	RES. MET. FILM SMD 0 Ω 1/10 W

COILS

REF. NO.	PART NO.	DESCRIPTION
L003	TLUABTA2R2K	COIL SHOCK 2,20 μH
L004	TLUABTA2R2K	COIL SHOCK 2,20 μH
L005	TLUABTA2R2K	COIL SHOCK 2,20 μH
L006	EXCELSA24T	FERRITE COIL W/ TERMINAL Z=20Ω
L008	TLUABTA470K	COIL PICO SHOCK 47 μH
L009	EXCELSA35T	FERRITE COIL
L140	ELESN180JA	SHOCK COIL 18 μH
L150	ELESN101KA	SHOCK COIL 100 μH
L151	ELESN270JA	SHOCK COIL 27 μH
L167	EQV7EN214P	VARIABLE COIL
L240	ELESN100JA	SHOCK COIL 10 μH
L351	TLUABTA101K	SHOCK COIL 100 μH
L551	(✳)	
L610	ELESN221KA	SHOCK COIL 220 μH
L611	EXCELSR35T	FERRITE COIL
L612	EXCELSR35T	FERRITE COIL
L620	ELESN100JA	SHOCK COIL 10 μH
L751	(✳)	
L752	(✳)	
L801	ELF18DZ660EZ	LINE FILTER
L803	ELEIN680KA	COIL DE PICO
L804	ELEIN680KA	COIL PICO SHOCK
L850	EXCELDR35V	COIL Z=80 Ω(100MHZ)
L851	EXCELDR35V	COIL Z=80 Ω(100MHZ)
L853	EXCELDR35V	COIL Z=80 Ω(100MHZ)
L2201	ELESN102JA	SHOCK COIL 1.000 μH
L2202	ELESN471JA	SHOCK COIL 470 μH
L2302	TLUABTA2R2K	SHOCK COIL 2,20 μH

TRANSISTORS

REF. NO.	PART NO.	DESCRIPTION
Q001	MSD601-RT1	TRANS. SMD NPN 0,2 W
Q002	2SC1685RSTA	TRANS. NPN
Q003	MSB709-RT1	TRANS. SMD PNP 0,2 W
Q004	MSB709-RT2	TRANS. SMD PNP 0,2 W
Q005	MSD601-RT2	TRANS. SMD NPN 0,2 W
Q140	MSD601-RT3	TRANS. SMD NPN 0,2 W
Q151	MSB709-RT3	TRANS. SMD PNP 0,2 W
Q160	MSB709-RT4	TRANS. SMD PNP 0,2 W
Q161	MSB709-RT5	TRANS. SMD PNP 0,2 W
Q351	(✳)	
Q352	(✳)	
Q353	(✳)	
Q401	MSD601-RT5	TRANS. SMD NPN 0,2 W
Q402	MSB709-RT7	TRANS. SMD PNP 0,2 W
Q403	MSB709-RT8	TRANS. SMD PNP 0,2 W
Q404	MSD601-RT6	TRANS. SMD NPN 0,2 W
Q405	MSB709-RT9	TRANS. SMD PNP 0,2 W
Q501	(✳)	
Q502	MSD601-RT7	TRANS. SMD NPN 0,2 W
Q551	2SD2539LB306	TRANS. DE NPN H-OUT
Q601	MSD601-RT8	TRANS. SMD NPN 0,2 W
Q602	MSD601-RT9	TRANS. SMD NPN 0,2 W
Q603	MSD601-RT10	TRANS. SMD NPN 0,2 W
Q604	MSD601-RT11	TRANS. SMD NPN 0,2 W
Q605	MSD601-RT12	TRANS. SMD NPN 0,2 W

TRANSISTORS

REF. NO.	PART NO.	DESCRIPTION
Q750	(✳)	
Q751	(✳)	
Q752	(✳)	
Q753	(✳)	
Q754	(✳)	
Q756	(✳)	
Q2201	MSD601-RT4	TRANS. SMD NPN 0,2 W
Q2302	MSB709-RT6	TRANS. SMD PNP 0,2 W

RESISTORS

REF. NO.	PART NO.	DESCRIPTION
R002	ERJ6GEYJ123V	RES. MET. FILM SMD 12 kΩ 1/10 W
R003	ERDS2TJ562T	RES. CARBON 5,60 kΩ 1/4 W
R004	ERDS2TJ561T	RES. CARBON 560 Ω 1/4 W
R005	ERDS2TJ101T	RES. CARBON 100 Ω 1/4 W
R006	ERJ6GEYJ391V	RES. MET. FILM SMD 390 Ω 1/10 W
R007	ERJ6GEYJ561V	RES. MET. FILM SMD 560 Ω 1/10 W
R008	ERDS2TJ562T	RES. CARBON 5,60 kΩ 1/4 W
R010	ERDS2TJ222T	RES. CARBON 2,20 kΩ 1/4 W
R011	ERJ6GEYJ684V	RES. MET. FILM SMD 680 kΩ 1/10 W
R012	ERDS2TJ473T	RES. CARBON 47 kΩ 1/4 W
R013	ERJ6GEYJ472V	RES. MET. FILM SMD 4,70 kΩ 1/10 W
R014	ERJ6GEYJ472V	RES. MET. FILM SMD 4,70 kΩ 1/10 W
R015	ERDS2TJ474T	RES. CARBON 470 kΩ 1/4 W
R016	ERDS2TJ223T	RES. CARBON 22 kΩ 1/4 W
R018	ERJ6GEYJ103V	RES. MET. FILM SMD 10 kΩ 1/10 W
R019	ERJ6GEYJ103V	RES. MET. FILM SMD 10 kΩ 1/10 W
R020	ERJ6GEYJ182V	RES. MET. FILM SMD 1,80 kΩ 1/10 W
R021	ERJ6GEYJ101V	RES. MET. FILM SMD 100 Ω 1/10 W
R022	ERJ6GEYJ101V	RES. MET. FILM SMD 100 Ω 1/10 W
R023	ERDS2TJ102T	RES. CARBON 1 kΩ 1/4 W
R024	ERJ6GEYJ681V	RES. MET. FILM SMD 680 Ω 1/10 W
R025	ERDS2TJ562T	RES. CARBON 5,60 kΩ 1/4 W
R026	ERDS2TJ562T	RES. CARBON 5,60 kΩ 1/4 W
R027	ERDS2TJ562T	RES. CARBON 5,60 kΩ 1/4 W
R028	ERDS2TJ471T	RES. CARBON 470 Ω 1/4 W
R029	ERJ6GEYJ102V	RES. MET. FILM SMD 1 kΩ 1/10 W
R030	ERJ6GEYJ102V	RES. MET. FILM SMD 1 kΩ 1/10 W
R031	ERJ6GEY0R00V	RES. MET. FILM SMD 0 Ω 1/10 W
R032	ER0S2TKF1002	RES. CARBON 10 kΩ 1/4 W
R033	ERJ6GEYJ222V	RES. MET. FILM SMD 2,20 kΩ 1/10 W
R034	ERJ6GEYJ222V	RES. MET. FILM SMD 2,20 kΩ 1/10 W
R035	ERJ6GEYJ332V	RES. MET. FILM SMD 3,30 kΩ 1/10 W
R036	ERJ6GEYJ562V	RES. MET. FILM SMD 5,60 kΩ 1/10 W
R037	ERJ6GEYJ103V	RES. MET. FILM SMD 10 kΩ 1/10 W
R038	ERJ6GEYJ223V	RES. MET. FILM SMD 22 kΩ 1/10 W
R039	ERDS2TJ102T	RES. CARBON 1 kΩ 1/4 W
R040	ERJ6GEYJ103V	RES. MET. FILM SMD 10 kΩ 1/10 W
R041	ERJ6GEYJ103V	RES. MET. FILM SMD 10 kΩ 1/10 W
R043	ERJ6GEYJ102V	RES. MET. FILM SMD 1 kΩ 1/10 W
R044	ERJ6GEYJ103V	RES. MET. FILM SMD 10 kΩ 1/10 W
R045	ERDS2TJ222T	RES. CARBON 2,20 kΩ 1/4 W
R046	ERJ6GEYJ103V	RES. MET. FILM SMD 10 kΩ 1/10 W
R049	ERDS2TJ152T	RES. CARBON 1,50 kΩ 1/4 W
R146	ERJ6GEYJ331V	RES. MET. FILM SMD 330 Ω 1/10 W
R147	ERJ6GEYJ271V	RES. MET. FILM SMD 270 Ω 1/10 W
R148	ERJ6GEYJ222V	RES. MET. FILM SMD 2,20 kΩ 1/10 W
R152	ERDS2TJ393T	RES. CARBON 39 kΩ 1/4 W
R153	ERJ6GEYJ473V	RES. MET. FILM SMD 47 kΩ 1/10 W
R154	ERDS2TJ823T	RES. CARBON 82 kΩ 1/4 W
R155	ERDS2TJ331T	RES. CARBON 330 Ω 1/4 W
R156	ERJ6GEYJ684V	RES. MET. FILM SMD 680 kΩ 1/10 W
R157	ERJ6GEYJ681V	RES. MET. FILM SMD 680 Ω 1/10 W
R158	ERJ6GEYJ472V	RES. MET. FILM SMD 4,70 kΩ 1/10 W
R159	ERJ6GEYJ223V	RES. MET. FILM SMD 22 kΩ 1/10 W
R160	ERDS2TJ221T	RES. CARBON 220 Ω 1/4 W
R161	TRJ6GEYJ334V	RES. MET. FILM SMD 330 kΩ 1/10 W
R163	ERJ6GEYJ332V	RES. MET. FILM SMD 3,30 kΩ 1/10 W
R164	ERDS2TJ271T	RES. CARBON 270 Ω 1/4 W
R166	ERJ6GEYJ391V	RES. MET. FILM SMD 390 Ω 1/10 W

(∗) Please refer to the **Especial Replacement Parts Table** on page 40.

REF. NO.	PART NO.	DESCRIPTION
RESISTORS		
R167	ERDS2TJ181T	RES. CARBON 180 Ω 1/4 W
R168	ERJ6GEY0R00V	RES. MET. FILM SMD 0 Ω 1/10 W
R170	ERJ6GEYJ471V	RES. MET. FILM SMD 470 Ω 1/10 W
R171	ERJ6GEYJ682V	RES. MET. FILM SMD 6,80 kΩ 1/10 W
R172	ERDS2TJ331T	RES. CARBON 330 Ω 1/4 W
R173	ERDS2TJ101T	RES. CARBON 100 Ω 1/4 W
R203	ERJ6GEY0R00V	RES. MET. FILM SMD 0 Ω 1/10 W
R240	ERJ6GEYJ471V	RES. MET. FILM SMD 470 Ω 1/10 W
R351	(∗)	
R352	(∗)	
R353	(∗)	
R354	ERDS1TJ272T	RES. CARBON 2,70 kΩ 1/2 W
R355	ERDS1TJ272T	RES. CARBON 2,70 kΩ 1/2 W
R356	ERDS1TJ272T	RES. CARBON 2,70 kΩ 1/2 W
R357	(∗)	
R358	(∗)	
R359	(∗)	
R360	(∗)	
R361	(∗)	
R362	(∗)	
R363	ERDS2TJ101T	RES. CARBON 100 Ω 1/4 W
R364	ERDS2TJ101T	RES. CARBON 100 Ω 1/4 W
R365	ERDS2TJ101T	RES. CARBON 100 Ω 1/4 W
R402	(∗)	
R403	ERJ6GEYJ473V	RES. MET. FILM SMD 47 kΩ 1/10 W
R404	ERJ6GEYJ473V	RES. MET. FILM SMD 47 kΩ 1/10 W
R406	(∗)	
R407	(∗)	
R408	ERJ6GEY0R00V	RES. MET. FILM SMD 0 Ω 1/10 W
R409	ERDS2TJ102T	RES. CARBON 1 kΩ 1/4 W
R410	ERJ6GEYJ103V	RES. MET. FILM SMD 10 kΩ 1/10 W
R411	ERJ6GEYJ562V	RES. MET. FILM SMD 5,60 kΩ 1/10 W
R412	ERJ6GEYJ472V	RES. MET. FILM SMD 4,70 kΩ 1/10 W
R414	ERDS1FJ471P	RES. CARBON 470 Ω 1/2 W
R415	(∗)	
R420	ERX12SJR47E	RES. MET. FILM 0,47 Ω 1/2 W
R421	ERJ6GEYJ103V	RES. MET. FILM SMD 10 kΩ 1/10 W
R422	ERDS2TJ682T	RES. CARBON 6,80 kΩ 1/4 W
R424	ERJ6GEYJ152V	RES. MET. FILM SMD 1,50 kΩ 1/8 W
R425	ERDS2TJ103T	RES. CARBON 10 kΩ 1/4 W
R426	ERJ6GEYJ103V	RES. MET. FILM SMD 10 kΩ 1/10 W
R427	ERJ6GEYJ683V	RES. MET. FILM SMD 68 kΩ 1/10 W
R428	ERJ6GEYJ334V	RES. MET. FILM SMD 330 kΩ 1/10 W
R450	ERDS2TJ683T	RES. CARBON 68 kΩ 1/4 W
R451	ERJ6GEYJ223V	RES. MET. FILM SMD 22 kΩ 1/10 W
R452	ERJ6ENF1183V	RES. MET. FILM SMD 118 kΩ 1/10 W
R453	ERJ6GEYJ122V	RES. MET. FILM SMD 1,20 kΩ 1/10 W
R454	ERJ6GEYJ682V	RES. MET. FILM SMD 6,80 kΩ 1/10 W
R455	ERDS2TJ272T	RES. CARBON 2,70 kΩ 1/4 W
R456	ERJ6GEYJ152V	RES. MET. FILM SMD 1,50 kΩ 1/8 W
R457	ERDS2TJ684T	RES. CARBON 680 kΩ 1/4 W
R470	ERJ6GEYJ271V	RES. MET. FILM SMD 270 Ω 1/10 W
R471	ERDS2TJ273T	RES. CARBON 27 kΩ 1/4 W
R472	ERJ6GEYJ221V	RES. MET. FILM SMD 220 Ω 1/10 W
R473	ERJ6GEYJ274V	RES. MET. FILM SMD 270 kΩ 1/10 W
R503	ERJ6GEYJ224V	RES. MET. FILM SMD 220 kΩ 1/10 W
R504	(∗)	
R505	(∗)	
R506	ERJ6GEYJ101V	RES. MET. FILM SMD 100 Ω 1/10 W
R510	ERJ6GEYJ563V	RES. MET. FILM SMD 56 kΩ 1/10 W
R511	ERJ6GEYJ473V	RES. MET. FILM SMD 47 kΩ 1/10 W
R512	(∗)	
R513	ERJ6GEYJ152V	RES. MET. FILM SMD 1,50 kΩ 1/8 W
R514	ERJ6GEY0R00V	RES. MET. FILM SMD 0 Ω 1/10 W
R515	ERJ6GEYJ393V	RES. MET. FILM SMD 39 kΩ 1/10 W
R516	ERJ6GEYJ222V	RES. MET. FILM SMD 2,20 kΩ 1/10 W
R517	ERJ6GEYJ274V	RES. MET. FILM SMD 270 kΩ 1/10 W
R518	ERDS2TJ684T	RES. CARBON 680 kΩ 1/4 W
R519	ERJ6GEYJ822V	RES. MET. FILM SMD 8,20 kΩ 1/10 W

REF. NO.	PART NO.	DESCRIPTION
RESISTORS		
R520	ERDS2TJ562T	RES. CARBON 5,60 kΩ 1/4 W
R522	ERJ6GEYJ101V	RES. MET. FILM SMD 100 Ω 1/10 W
R523	ERJ6GEYJ471V	RES. MET. FILM SMD 470 Ω 1/10 W
R524	ERDS2TJ681T	RES. CARBON 680 Ω 1/4 W
R525	ERJ6GEYF304V	RES. MET. FILM SMD 300 kΩ 1/10 W
R526	ERJ6GEYF514V	RES. MET. FILM SMD 510 kΩ 1/10 W
R527	ER0S2TKF1003	RES. CARBON 100 kΩ 1/4 W
R528	(∗)	
R550	(∗)	
R551	(∗)	
R552	(∗)	
R553	(∗)	
R554	ERDS1FJ1R0P	RES. CARBON 1 Ω 1/2 W
R555	ERQ12HKR68P	FUSISTOR 0,68 Ω 1/2 W
R556	ERDS2TJ223T	RES. CARBON 22 kΩ 1/4 W
R558	(∗)	
R559	ERDS1FJ1R0P	RES. CARBON 1 Ω 1/2 W
R561	(∗)	
R562	(∗)	
R563	ERD50FJ474P	RES. CARBON 470 kΩ 1/2 W
R564	(∗)	
R570	ERG3FJ560H	RES. MET. FILM 56 Ω 3 W
R571	ERG3FJ560H	RES. MET. FILM 56 Ω 3 W
R602	ERJ6GEYJ331V	RES. MET. FILM SMD 330 Ω 1/10 W
R603	ERJ6GEYJ331V	RES. MET. FILM SMD 330 Ω 1/10 W
R604	ERJ6GEYJ331V	RES. MET. FILM SMD 330 Ω 1/10 W
R605	ERJ6GEYJ821V	RES. MET. FILM SMD 820 Ω 1/10 W
R606	ERJ6GEYJ821V	RES. MET. FILM SMD 820 Ω 1/10 W
R607	ERJ6GEYJ821V	RES. MET. FILM SMD 820 Ω 1/10 W
R609	ERDS2TJ100T	RES. CARBON 10 Ω 1/4 W
R610	ERDS2TJ100T	RES. CARBON 10 Ω 1/4 W
R611	ERDS2TJ123T	RES. CARBON 12 kΩ 1/4 W
R612	ERJ6GEYJ103V	RES. MET. FILM SMD 10 kΩ 1/10 W
R613	ERDS2TJ123T	RES. CARBON 12 kΩ 1/4 W
R614	ERJ6GEYJ123V	RES. MET. FILM SMD 12 kΩ 1/10 W
R615	ERDS2TJ103T	RES. CARBON 10 kΩ 1/4 W
R616	ERJ6GEYJ681V	RES. MET. FILM SMD 680 Ω 1/10 W
R617	ERJ6GEYJ681V	RES. MET. FILM SMD 680 Ω 1/10 W
R618	ERJ6GEYJ681V	RES. MET. FILM SMD 680 Ω 1/10 W
R619	ERJ6GEYJ475V	RES. MET. FILM SMD 4,7 MΩ 1/10 W
R620	ERJ6GEYJ221V	RES. MET. FILM SMD 220 Ω 1/10 W
R621	ERJ6GEYJ471V	RES. MET. FILM SMD 470 Ω 1/10 W
R622	ERJ6GEYJ272V	RES. MET. FILM SMD 2,7 kΩ 1/10 W
R623	ERJ6GEYJ915V	RES. MET. FILM SMD 9,1 MΩ 1/10 W
R630	ERJ6GEYJ103V	RES. MET. FILM SMD 10 kΩ 1/10 W
R631	ERJ6GEYJ103V	RES. MET. FILM SMD 10 kΩ 1/10 W
R632	ERJ6GEYJ103V	RES. MET. FILM SMD 10 kΩ 1/10 W
R742	(∗)	
R750	(∗)	
R753	(∗)	
R754	(∗)	
R755	(∗)	
R756	(∗)	
R757	(∗)	
R758	(∗)	
R759	(∗)	
R760	(∗)	
R761	(∗)	
R762	(∗)	
R763	(∗)	
R764	(∗)	
R765	(∗)	
R766	(∗)	
R767	(∗)	
R768	(∗)	
R769	(∗)	
R770	(∗)	
R771	(∗)	
R772	(∗)	

(✳) Please refer to the **Especial Replacement Parts Table** on page 40.

RESISTORS		
REF. NO.	PART NO.	DESCRIPTION
R773	(✳)	
R774	(✳)	
R775	(✳)	
R776	(✳)	
R777	(✳)	
R778	(✳)	
R801	(✳)	
R802	ERG2FJ683H	RES. MET. FILM 68 kΩ 2 W
R803	ERD50FJ474P	RES. CARBON 470 kΩ 1/2 W
R804	ERD25TJ681T	RES. CARBON 680 Ω 1/4 W
R805	(✳)	
R806	ERD25TJ332T	RES. CARBON 3,30 kΩ 1/4 W
R807	ERDS1FJ220T	RES. CARBON 22 Ω 1/2 W
R813	ERDS2TJ333T	RES. CARBON 33 kΩ 1/4 W
R814	(✳)	
R815	(✳)	
R816	ERDS2TJ182T	RES. CARBON 1,80 kΩ 1/4 W
R817	(✳)	
R817	ERC12ZGM825D	RES. CARBON 8,20 MΩ 1/2 W
R820	ERDS2TJ153T	RES. CARBON 15 kΩ 1/4 W
R821	ERJ6GEYJ392V	RES. MET. FILM SMD 3,9 kΩ 1/10 W
R822	(✳)	
R851	ERD25TJ122T	RES. CARBON 1,20 kΩ 1/4 W
R852	ERJ6GEYJ102V	RES. MET. FILM SMD 1 kΩ 1/10 W
R855	ERQ12HJ1R0P	FUSISTOR 1 Ω 1/2 W
R857	ERQ1CKPR56S	FUSISTOR 0,56 Ω 1 W
R2201	ERJ6GEYJ472V	RES. MET. FILM SMD 4,70 kΩ 1/10 W
R2202	ERJ6GEYJ153V	RES. MET. FILM SMD 15 kΩ 1/10 W
R2203	ERJ6GEYJ104V	RES. MET. FILM SMD 100 kΩ 1/10 W
R2204	ERJ6GEYJ473V	RES. MET. FILM SMD 47 kΩ 1/10 W
R2205	ERJ6GEYJ154V	RES. MET. FILM SMD 150 kΩ 1/10 W
R2206	ERJ6GEYJ102V	RES. MET. FILM SMD 1 kΩ 1/10 W
R2207	ERJ6GEYJ102V	RES. MET. FILM SMD 1 kΩ 1/10 W
R2208	ERJ6ENF9102V	RES. MET. FILM SMD 91 kΩ 1/10 W
R2209	ERJ6GEYJ682V	RES. MET. FILM SMD 6,80 kΩ 1/10 W
R2214	ERJ6GEY0R00V	RES. MET. FILM SMD 0 Ω 1/10 W
R2215	ERJ6GEY0R00V	RES. MET. FILM SMD 0 Ω 1/10 W
R2216	ERJ6GEYJ154V	RES. MET. FILM SMD 150 kΩ 1/10 W
R2217	ERJ6GEYJ224V	RES. MET. FILM SMD 220 kΩ 1/10 W
R2218	ERJ6GEYJ101V	RES. MET. FILM SMD 100 Ω 1/10 W
R2219	ERJ6GEYJ562V	RES. MET. FILM SMD 5,60 kΩ 1/10 W
R2220	ERJ6GEYJ332V	RES. MET. FILM SMD 3,30 kΩ 1/10 W
R2301	ERQ2CJP1R8S	FUSISTOR 1,80 Ω 2 W
R2302	ERJ6GEY0R00V	RES. MET. FILM SMD 0 Ω 1/10 W
R2303	ERD25FJ1R0P	RES. CARBON 1 Ω 1/4 W
R2304	ERDS2TJ682T	RES. CARBON 6,80 kΩ 1/4 W
R2311	ERJ6GEYJ332V	RES. MET. FILM SMD 3,30 kΩ 1/10 W
R2312	ERJ6GEYJ682V	RES. MET. FILM SMD 6,80 kΩ 1/10 W
R2313	ERJ6GEYJ683V	RES. MET. FILM SMD 68 kΩ 1/10 W
R2314	ERJ6GEYJ104V	RES. MET. FILM SMD 100 kΩ 1/10 W
R2315	ERJ6GEY0R00V	RES. MET. FILM SMD 0 Ω 1/10 W
R2317	ERDS2TJ561T	RES. CARBON 560 Ω 1/4 W
R2318	ERJ6GEYJ103V	RES. MET. FILM SMD 10 kΩ 1/10 W
R2319	ERDS2TJ562T	RES. CARBON 5,60 kΩ 1/4 W
R2320	ERJ6GEY0R00V	RES. MET. FILM SMD 0 Ω 1/10 W
R2321	ERDS2TJ101T	RES. CARBON 100 Ω 1/4 W
R2322	ERJ6GEYJ472V	RES. MET. FILM SMD 4,70 kΩ 1/10 W
R2352	ERJ6GEY0R00V	RES. MET. FILM SMD 0 Ω 1/10 W
R2353	ERD25FJ1R0P	RES. CARBON 1 Ω 1/4 W
R2354	ERDS2TJ682T	RES. CARBON 6,80 kΩ 1/4 W
R2357	ERJ6GEYJ122V	RES. MET. FILM SMD 1,20 kΩ 1/10 W
R2358	ERJ6GEYJ103V	RES. MET. FILM SMD 10 kΩ 1/10 W
R2359	ERJ6GEYJ122V	RES. MET. FILM SMD 1,20 kΩ 1/10 W
R2360	ERJ6GEYJ103V	RES. MET. FILM SMD 10 kΩ 1/10 W
R2361	ERDS2TJ681T	RES. CARBON 680 Ω 1/4 W
R2362	ERJ6GEYJ681V	RES. MET. FILM SMD 680 Ω 1/10 W
R2454	ERDS2TJ225T	RES. CARBON 2,20 MΩ 1/4 W
R2455	ERJ6GEYJ243V	RES. MET. FILM SMD 24 kΩ 1/10 W
R2456	ERJ6GEYJ223V	RES. MET. FILM SMD 22 kΩ 1/10 W

RESISTORS		
REF. NO.	PART NO.	DESCRIPTION
R3005	ERDS2TJ750T	RES. CARBON 75 Ω 1/4 W
R3006	ERDS2TJ391T	RES. CARBON 390 Ω 1/4 W
R3007	ERDS2TJ682T	RES. CARBON 6,80 kΩ 1/4 W
R3008	ERDS2TJ682T	RES. CARBON 6,80 kΩ 1/4 W
R3009	ERJ6GEYJ334V	RES. MET. FILM SMD 330 kΩ 1/10 W
R3010	ERJ6GEYJ334V	RES. MET. FILM SMD 330 kΩ 1/10 W

SWITCHES		
S001	BVQPB001T	SWITCH
S002	BVQPB001T	SWITCH
S003	BVQPB001T	SWITCH
S004	BVQPB001T	SWITCH
S005	BVQPB001T	SWITCH
S006	BVQPB001T	SWITCH
S007	BVQPB001T	SWITCH
S801	ESB92DA1B	SWITCH

TRANSFORMERS		
T501	(✳)	
T551	(✳)	
T801	ETS39AD296AD	TRANSFORMER

TUNER		
TNR001	ENV56D75G3R	TUNER

CRYSTALS		
X001	TSSA010	CRISTAL PIEZO F.: 12.000 MHZ
X101	M1969M	SAW FILTER
X140	EFCT4R5MW5	TRAP FILTER F: 4,50 MHZ
X240	EFCT4R5MS5W	CERAMIC FILTER
X520	TAFCSB503F18	CERAMIC OSCILATOR
X601	TSSA161	CRISTALOSCILATOR
X602	TSSA162	CRISTAL OSCILATOR
X603	TSS2143TD	CRISTAL OSCILATOR

OTHERS		
RL801	TSEH8007	RELAY 12 VDC 250 VAC
SPK	BJP11V04-AP	BASE - 4 PINS
Z1	BJP11V03-AP	BASE - 3 PINS
Z2	BJP11V06-AP	BASE - 6 PINS
JK3001	TJB2A9063B	AV CONNECTOR
JK351	TJSC00300	CRT SOCKET

Ref. No.	TC-20G12P	TC-29G12P	TC-29G12PU
C514	ECJ2VC1H102J	ECJ2VC1H122J	ECJ2VC1H122J
C518	ECA1EM4R7B	ECA1HM100B	ECA1HM100B
C552	ECKR2H222KB5	ECKR2H102KB5	ECKR2H102KB5
C562	ECWF2394JBB	ECWF2474JBB	ECWF2474JBB
C563	ECWH12H822JS	ECWH12H123JS	ECWH12H123JS
C564	ECKW3D681JBP	ECKW3D152JBP	ECKW3D152JBP
C565	ECKW3D222JBP	ECKW3D821JBP	ECKW3D821JBP
C567	- - - - - o - - - - -	ECQM2473JZW	ECQM2473JZW
C746	- - - - - o - - - - -	ECJ2VB1C224K	ECJ2VB1C224K
C751	- - - - - o - - - - -	ECEA1EN330UB	ECEA1EN330UB
C752	- - - - - o - - - - -	ECEA1EN330UB	ECEA1EN330UB
C753	- - - - - o - - - - -	ECEA1EN330UB	ECEA1EN330UB
C754	- - - - - o - - - - -	ECQB1H104JM3	ECQB1H104JM3
C755	- - - - - o - - - - -	ECQB1H104JM3	ECQB1H104JM3
C756	- - - - - o - - - - -	ECA1CM221B	ECA1CM221B
C757	- - - - - o - - - - -	ECA1VM221B	ECA1VM221B
C758	- - - - - o - - - - -	ECQE1395KNB	ECQE1395KNB
C759	- - - - - o - - - - -	ECJ2VB1H223K	ECJ2VB1H223K
C760	- - - - - o - - - - -	ECJ2VC1H101J	ECJ2VC1H101J
C824	EC0S2GP221CB	EC0S2GP331DA	EC0S2GP331DA
D558	- - - - - o - - - - -	RS3FS	RS3FS
D559	- - - - - o - - - - -	RU2M	RU2M
D751	- - - - - o - - - - -	MA4200MTA	MA4200MTA
D752	- - - - - o - - - - -	MA2270B	MA2270B
D801	TAP2B0001	TAP4GA0005	TAP4GA0005
D805	- - - - - o - - - - -	TAP4GA0005	TAP4GA0005
IC1	NBT2048S	NBT2048S	NBT2048S
IC801	STRF6654LF53	STRF6656LF53	STRF6656LF53
L551	ELH5LZ43Z	ELH5LZ44Z	ELH5LZ44Z
L751	- - - - - o - - - - -	ELC18B301L	ELC18B301L
L752	- - - - - o - - - - -	EXCELDR35V	EXCELDR35V
Q351	2SC1573AH	2SC3063RL	2SC3063RL
Q352	2SC1573AH	2SC3063RL	2SC3063RL
Q353	2SC1573AH	2SC3063RL	2SC3063RL
Q501	2SC1573AH	2SC4212HLB	2SC4212HLB
Q750	- - - - - o - - - - -	2SD601ATX	2SD601ATX
Q751	- - - - - o - - - - -	2SD601ATX	2SD601ATX
Q752	- - - - - o - - - - -	2SA564AQRTA	2SA564AQRTA
Q753	- - - - - o - - - - -	2SD1266LB	2SD1266LB
Q754	- - - - - o - - - - -	2SD601ATX	2SD601ATX
Q756	- - - - - o - - - - -	2SD601ATX	2SD601ATX
R351	ERG2FJ153H	ERG2FJ123H	ERG2FJ123H
R352	ERG2FJ153H	ERG2FJ123H	ERG2FJ123H
R353	ERG2FJ153H	ERG2FJ123H	ERG2FJ123H
R357	ERDS2TJ391T	ERDS2TJ271T	ERDS2TJ271T
R358	ERDS2TJ391T	ERDS2TJ271T	ERDS2TJ271T
R359	ERDS2TJ391T	ERDS2TJ271T	ERDS2TJ271T
R360	ERDS2TJ822T	ERDS2TJ272T	ERDS2TJ272T
R361	ERDS2TJ822T	ERDS2TJ272T	ERDS2TJ272T
R362	ERDS2TJ822T	ERDS2TJ272T	ERDS2TJ272T
R402	ERJ6GEYJ393V	ERJ6GEYJ333V	ERJ6GEYJ333V

Ref. No.	TC-20G12P	TC-29G12P	TC-29G12PU
R406	ERDS1FJ1R5P	ERDS1FJ1R0P	ERDS1FJ1R0P
R407	ERJ6GEYJ562V	ERJ6GEYJ332V	ERJ6GEYJ332V
R415	ERDS1FJ4R7T	ERDS1FJ2R2T	ERDS1FJ2R2T
R504	ERJ6GEYJ821V	ERJ6GEYJ681V	ERJ6GEYJ681V
R505	ERJ6GEYJ472V	ERJ6GEYJ562V	ERJ6GEYJ562V
R512	ERG2FJ562H	ERG2FJ392H	ERG2FJ392H
R528	ERDS2TJ102T	ERDS2TJ331T	ERDS2TJ331T
R550	ERG3FJ182H	ERG3FJ392H	ERG3FJ392H
R551	- - - - - o - - - - -	ERG3FJ392H	ERG3FJ392H
R552	ERX3FJ4R7	- - - - - o - - - - -	- - - - - o - - - - -
R553	ERDS1FJ101T	- - - - - o - - - - -	- - - - - o - - - - -
R558	ERQ1CJP4R3S	ERQ1CKPR56S	ERQ1CKPR56S
R561	- - - - - o - - - - -	ERG2FJ102H	ERG2FJ102H
R562	ERG2FJ122H	- - - - - o - - - - -	- - - - - o - - - - -
R564	ER050PKF2103	ER050PKF1373	ER050PKF1373
R742	- - - - - o - - - - -	ERJ6GEYJ102V	ERJ6GEYJ102V
R750	- - - - - o - - - - -	ERJ6GEYJ681V	ERJ6GEYJ681V
R753	- - - - - o - - - - -	ERJ6GEYJ103V	ERJ6GEYJ103V
R754	- - - - - o - - - - -	ERG3FJ562	ERG3FJ562
R755	- - - - - o - - - - -	ERJ6GEYJ683V	ERJ6GEYJ683V
R756	- - - - - o - - - - -	ERJ6GEYJ103V	ERJ6GEYJ103V
R757	- - - - - o - - - - -	ERJ6GEYJ334V	ERJ6GEYJ334V
R758	- - - - - o - - - - -	ERJ6GEYJ393V	ERJ6GEYJ393V
R759	- - - - - o - - - - -	ERJ6GEYJ152V	ERJ6GEYJ152V
R760	- - - - - o - - - - -	EVND8AA03B53	EVND8AA03B53
R761	- - - - - o - - - - -	EVND8AA03B14	EVND8AA03B14
R762	- - - - - o - - - - -	ERJ6GEYJ182V	ERJ6GEYJ182V
R763	- - - - - o - - - - -	ERJ6GEYJ183V	ERJ6GEYJ183V
R764	- - - - - o - - - - -	ERJ6GEYJ393V	ERJ6GEYJ393V
R765	- - - - - o - - - - -	ERJ6GEYJ272V	ERJ6GEYJ272V
R766	- - - - - o - - - - -	ERDS2TJ362T	ERDS2TJ362T
R767	- - - - - o - - - - -	ERJ6GEYJ222V	ERJ6GEYJ222V
R768	- - - - - o - - - - -	ERQ2CJP100S	ERQ2CJP100S
R769	- - - - - o - - - - -	ERJ6GEYJ393V	ERJ6GEYJ393V
R770	- - - - - o - - - - -	ERJ6GEYJ752V	ERJ6GEYJ752V
R771	- - - - - o - - - - -	ERJ6GEYJ392V	ERJ6GEYJ392V
R772	- - - - - o - - - - -	ERJ6GEYJ102V	ERJ6GEYJ102V
R773	- - - - - o - - - - -	ERJ6GEYJ102V	ERJ6GEYJ102V
R774	- - - - - o - - - - -	ERJ6GEYJ152V	ERJ6GEYJ152V
R775	- - - - - o - - - - -	ERJ6GEYJ272V	ERJ6GEYJ272V
R776	- - - - - o - - - - -	ERJ6GEYJ823V	ERJ6GEYJ823V
R777	- - - - - o - - - - -	ERJ6GEYJ473V	ERJ6GEYJ473V
R778	- - - - - o - - - - -	ERJ6GEYJ473V	ERJ6GEYJ473V
R801	TAR26NJ2R2Z	TAR26NJ1R2Z	TAR26NJ1R2Z
R805	ERW2PKR15C	ERW2PKR22C	ERW2PKR22C
R814	- - - - - o - - - - -	ERW2PKR22C	ERW2PKR22C
R815	- - - - - o - - - - -	ERF5ZJ121	ERF5ZJ121
R817	- - - - - o - - - - -	ERC12ZGM825D	ERC12ZGM825D
R822	- - - - - o - - - - -	TAR26NJ1R2Z	TAR26NJ1R2Z
T501	ETH19Y70AYM	TLH15452	TLH15452
T551	KFT3AB119F1	KFT4AB143F	KFT4AB143F

Panasonic do Brasil Ltda.

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